4GENCY SALE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 77 WEST JACKSON BOULEVARD CHICAGO, IL 60604-3590

MAY 1 1 2015

REPLY TO THE ATTENTION OF: WU-16J

<u>CERTIFIED MAIL:</u> 7009 1680 0000 7675 6136 RETURN RECEIPT REQUESTED

Mr. Theodore A. Pagano General Manager Michigan Potash Operating, LLC 1225 17th Street, Suite 2200 Denver, Colorado 80202

Re: Permit Application for three Class I non-hazardous waste injection wells; U.S.

Environmental Protection Agency, Underground Injection Control Permit

Application #sMI-133-1I-0004, 0005, 0006

Dear Mr. Pagano:

EPA received the Michigan Potash permit application for three Class I non-hazardous waste injection wells on January 16, 2015. EPA's technical review of the application discovered discrepancies and lack of information regarding the following areas of the applications: well construction, Plugging and Abandonment Plan, injection formation fracture gradient, friction loss, and construction of wells within the area of review.

In order to continue the technical review of the application, EPA is requesting additional information (enclosed) to clarify the specifics of this project and to determine compliance with the Underground Injection Control regulations. Under 40 C.F.R. Part 2 Subpart B, you may assert a business confidentiality claim only to the extent and by means of the procedures at 40 C.F.R. Part 2 Subpart B. You must make any request for confidentiality when you submit the information since any information not so identified may be made available to the public without further notice.

Michigan Potash, LLC must submit all requested information under an authorized signature as set out in 40 C.F.R. § 144.32(a)(1) or (2), as applicable, and using the certification language in 40 C.F.R. § 144.32(d). These regulations are enclosed for your reference. Any documents received by EPA in response to this request with signatures not consistent with the above cited regulations will not be considered in evaluating the permit application for the proposed wells.

Should you have any questions regarding this request, please call Allan Batka of my staff at (312) 353-7316 or email at batka.allan@epa.gov.

Sincerely,

Stephen M. Jann, Chief Underground Injection Control Branch

Enclosures

Cc: J. Dean Geers, Atwell

Information Request (May 2015)

Michigan Potash, LLC, Permit Application #'s MI-133-1I-0004, 0005, 0006

- 1. Attachments F and Q, and EPA Form 7520-14 ("Plugging and Abandonment Plan page 2 diagram) of the permit application contain well construction diagrams that identify a 17 ½ inch hole and 13 3/8 inch casing for the construction of the surface casing for all three proposed wells. Attachment L, of the application, describes the construction procedures for the three wells and identifies a 13 ½ inch hole and 9 5/8 inch casing for the surface casing. Please identify consistent well dimensions on these Attachments and EPA form and identify any corrections to the cement calculation for cementing this casing to the surface.
- 2. The permit application for the three wells requests injection into the Reed City Dolomite, the Sylvania Sandstone, and the Bass Island Dolomite. Injection into the Sylvania Sandstone and the Bass Island Dolomite is identified through an open hole well construction. However, the permit application does not give detailed information on how the Reed City Dolomite will be accessed through all three wells. Attachment L.4 of the application generally identifies that the wells will be perforated and Attachment F.2 identifies that access to the Reed City Dolomite will only be made if the Sylvania Sandstone and Bass Island Dolomite will not accept fluid at the proposed volumes.

Please identify the detailed construction procedures for accessing the Reed City Dolomite through the three wells. This information should also identify that the Reed City will only be accessed if the Sylvania and Bass Island formations will not accept the proposed fluid volumes. Parts of the application that need to contain this information are the diagrams and descriptions in Attachments F, L, Q, and page 1 and 2 (for all three wells) of EPA Form 7520-14 "Plugging and Abandonment Plan". Please also note that the packer locations for each proposed well configuration (i.e., open hole and perforations) must be identified in the diagrams and descriptions identified above. EPA Region 5 requires that the packer be placed within 100 feet of the injection formation top.

- 3. The "Plugging and Abandonment Plan" (EPA Form 7520-14 page 1 and 2) did not contain the following information:
 - a. "Casing and Tubing Record After Plugging" (page 1 of EPA form). This section of the form must identify all proposed casing strings.
 - b. "Depth to Bottom of Tubing or Drill Pipe" (page 1 of EPA form). The bottom of the proposed plugs must be identified in this space.
 - c. "Measured Top of Plug" (page 1 of EPA form). Although the title identifies measure top of plug, an estimation of the plug tops must be entered in the space.
 - d. "List All Open Hole and/or Perforated Intervals . . ." (page 1 and 2 of EPA form). Open hole and perforated intervals must be identified.

Please submit revised Plugging and Abandonment Plans (EPA Form 7520-14, pages 1 and 2) for all three wells with an authorized signature as set out in 40 C.F.R. § 144.32(a)(1) or (2), as applicable.

- 4. Attachment H.2 of the permit application identifies that injection tests were made within the Reed City Dolomite. Results from these tests established a fracture gradient of 1.18 psi per foot and did not result in fracturing the tested formation. For EPA to consider this fracture gradient when calculating the maximum injection pressure for the proposed three wells, Michigan Potash must submit the test data referenced in Attachment H.2 of the application. A scaled map identifying Michigan Potash's three proposed injection wells and the well or wells used in the injection tests must also be submitted with the test results.
- 5. Attachment H.2 of the permit application identifies a calculated friction loss within the well of 38 psi. For EPA to consider this friction loss when calculating the maximum injection pressure within the three proposed injection wells, Michigan Potash must submit the well friction analysis that established the 38 psi pressure loss.
- 6. Attachment O of the permit application, "Plans For Well Failures", must include a statement that EPA will be contacted immediately upon the determination that mechanical integrity has been lost in any of the three proposed injection wells.
- 7. Attachment C of the application, "Corrective Action Plan and Well Data" identifies wells within the 2 mile area of review that penetrate the proposed injection formations. Construction and plugging documentation was not provided for the following wells:
 - a. Jensen 1-2, Permit # 37188
 - b. Pilarski 1-12, Permit #00340
 - c. Johnson 1-6, Permit #36067
 - d. Johnson 2-1, Permit #00377
 - e. Johnson 3-1, Permit #00337

Please submit the well construction and plugging documentation for these wells.

§ 144.32

S GOVERNMENT INFORMATION

- (9) For EPA-administered programs, the applicant shall identify and submit on a list with the permit application the names and addresses of all owners of record of land within one-quarter mile of the facility boundary. This requirement may be waived by the Regional Administrator where the site is located in a populous area and the Regional Administrator determines that the requirement would be impracticable.
- (10) A plugging and abandonment plan that meets the requirements of §146.10 of this chapter and is acceptable to the Director.
- (f) Recordkeeping. Applicants shall keep records of all data used to complete permit applications and any supplemental information submitted under §144.31 for a period of at least 3 years from the date the application is signed.
- (g) Information Requirements for Class I Hazardous Waste Injection Wells Permits. (1) The following information is required for each active Class I hazardous waste injection well at a facility seeking a UIC permit:
 - (i) Dates well was operated.
- (ii) Specification of all wastes which have been injected in the well, if available.
- (2) The owner or operator of any facility containing one or more active hazardous waste injection wells must submit all available information pertaining to any release of hazardous waste or constituents from any active hazardous waste injection well at the facility.
- (3) The owner or operator of any facility containing one or more active Class I hazardous waste injection wells must conduct such preliminary site investigations as are necessary to determine whether a release is occurring, has occurred, or is likely to have occurred.

[48 FR 14189, Apr. 1, 1983, as amended at 49 FR 20185, May 11, 1984; 52 FR 45797, Dec. 1, 1987; 52 FR 46963, Dec. 10, 1987; 58 FR 63897, Dec. 3, 1993; 75 FR 77288, Dec. 10, 2010]

§144.32 Signatories to permit applications and reports.

(a) Applications. All permit applications, except those submitted for Class II wells (see paragraph (b) of this section), shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means; (i) A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decisionmaking functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

Note: EPA does not require specific assignments or delegations of authority to responsible corporate officers identified in §144.32(a)(1)(i). The Agency will presume that these responsible corporate officers have the requisite authority to sign permit applications unless the corporation has notified the Director to the contrary. Corporate procedures governing authority to sign permit applications may provide for assignment or delegation to applicable corporate positions under §144.32(a)(1)(ii) rather than to specific individuals

- (2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
- (3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes: (i) The chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
- (b) Reports. All reports required by permits, other information requested by the Director, and all permit applications submitted for Class II wells under §144.31 shall be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- (1) The authorization is made in writing by a person described in paragraph (a) of this section;

Environmental Protection Agency

- (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position): and
- (3) The written authorization is submitted to the Director.
- (c) Changes to authorization. If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
- (d) Certification. Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:
- I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(Clean Water Act (33 U.S.C. 1251 et seq.), Safe Drinking Water Act (42 U.S.C. 300f et seq.), Clean Air Act (42 U.S.C. 7401 et seq.), Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.)

[48 FR 14189, Apr. 1, 1983, as amended at 48 FR 39621, Sept. 1, 1983]

§ 144.33 Area permits.

- (a) The Director may issue a permit on an area basis, rather than for each well individually, provided that the permit is for injection wells:
- (1) Described and identified by location in permit application(s) if they are existing wells, except that the Director

may accept a single description of wells with substantially the same characteristics;

- (2) Within the same well field, facility site, reservoir, project, or similar unit in the same State;
- (3) Operated by a single owner or operator; and
- (4) Used to inject other than hazardous waste; and
 - (5) Other than Class VI wells.
 - (b) Area permits shall specify:
- (1) The area within which underground injections are authorized, and
- (2) The requirements for construction, monitoring, reporting, operation, and abandonment, for all wells authorized by the permit.
- (c) The area permit may authorize the permittee to construct and operate, convert, or plug and abandon wells within the permit area provided:
- (1) The permittee notifies the Director at such time as the permit requires;
- (2) The additional well satisfies the criteria in paragraph (a) of this section and meets the requirements specified in the permit under paragraph (b) of this section; and
- (3) The cumulative effects of drilling and operation of additional injection wells are considered by the Director during evaluation of the area permit application and are acceptable to the Director.
- (d) If the Director determines that any well constructed pursuant to paragraph (c) of this section does not satisfy any of the requirements of paragraphs (c) (1) and (2) of this section the Director may modify the permit under §144.39, terminate under §144.40, or take enforcement action. If the Director determines that cumulative effects are unacceptable, the permit may be modified under §144.39.

[48 FR 14189, Apr. 1, 1983, as amended at 75 FR 77288, Dec. 10, 2010]

§144.34 Emergency permits.

- (a) Coverage. Notwithstanding any, other provision of this part or part 124, the Director may temporarily permit a specific underground injection if:
- (1) An imminent and substantial endangerment to the health of persons will result unless a temporary emergency permit is granted; or



May 22nd, 2015

Mr. Steven M. Jann Chief, UIC Branch (WU-16J) US EPA Region 5 77 W. Jackson Blvd. Chicago, IL 60604-3590

VIA: Priority Tracking, USPS

Re: CLASS I NON HAZARDOUS APPLICATION No. MI-133-1I-0004,0005,0006

OSCEOLA AND MECOSTA COUNTY, MICHIGAN

INFORMATION REQUEST (MAY 2015)

Dear Mr. Jann:

In response to your Letter dated, May 11TH 2015, please find enclosed, respectfully submitted for your review, our first response to your inquiry concerning the above reference UIC application.

If you have any questions or require any additional information, please feel free to contact me directly at 970 590 3944.

Sincerely yours,

Theodore Pagano, P.E., P.G.

General Manager

Michigan Potash Operating, LLC

tpagano@mipotash.com



OPERATOR RESPONSE TO EPA REGION V REQUEST FOR ADDITIONAL INFORMATION, CLASS I NON HAZARDOUS PERMIT APPLICATION NOS: MI-133-1I-0004,0005,0006 MAY 2015

TABLE OF CONTENTS

EPA REQUEST, PARAGRAPH 1.

- 1.1 Clarify the surface hole size.
- 1.2 Clarify the surface casing size.
- 1.3 Correct the cement calculation for cementing the casing to surface.
- 1.4 Amended and corrected attachments reflecting 1.1-1.3.

Amended ATTACHEMENT F, Figures F14.

Amended ATTACHEMENT L

Amended ATTACHEMENT M

EPA REQUEST, PARAGRAPH 2.

- 2.1 Identify the detailed construction procedures for accessing the Reed City Dolomite. This information should also identify that the Reed City will only be accessed if the Sylvania and Bass Island formations will not accept the proposed fluid volumes. Also clarify contingent Packer location provided the Reed City Dolomite is accessed.
- 2.2 Amend and/or replace the Attachments F, L, Q and EPA Form 7520-14 to be consistent with the requested information showing access to the Reed City Dolomite.

Amended ATTACHEMENT O

Amended EPA FORM 7520-14

EPA REQUEST, PARAGRAPH 3.

3.1 Amend and/or replace "Plugging and Abandonment Plan" (EPA Form 7520-14).

EPA REQUST, PARAGRAPH 4.

4.1 Submit injection test data for the Reed City Dolomite.

Excerpts, 2006 RE-APPLICATION for MI-133-1I-0001 (the Woodward 1-26) and MI-133-1I-0002 (the Thomas 1-26) permit criteria

Excerpts, Operating Conditions, for MI-133-1I-0001, MI-133-1I-0002

4.2 Submit a scaled map identifying Michigan Potash's three proposed injection wells and the well or wells used in the injection tests.

AMENDED ATTACHEMENT H.2. FIGURE H.2, Scaled Map FIGURE B2.

4.3 Other applicable information.



EPA REQUEST, PARAGRAPH 5.

5.1 Submit the well friction analysis that established the 38 psi pressure loss.

EPA REQUEST, PARAGRAPH 6.

6.1 Amend Attachment O.

EPA REQUEST, PARAGRAPH 7.

- 7.1 Submit the well construction and plugging documentation for the
 - a. Jensen 1-2, Permit # 37188
 - b. Pilarski 1-12, Permit #00340
 - c. Johnson 1-6, Permit #36067
 - d. Johnson 2-1, Permit #00377
 - e. Johnson 3-1, Permit #00337





OPERATOR RESPONSE TO EPA REGION V REQUEST FOR ADDITIONAL INFORMATION, CLASS I NON HAZARDOUS PERMIT APPLICATION NOS: MI-133-1I-0004,0005,0006 MAY 2015

EPA request for Additional Information (May 2015):

1. Attachments F and Q, and EPA Form 7520-14 ("Plugging and Abandonment Plan page 2 diagram) of the permit application contain well construction diagrams that identify a 17 1/2 inch hole and 13 3/8 inch casing for the construction of the surface casing for all three proposed wells. Attachment L, of the application, describes the construction procedures for the three wells and identifies a 13 3/8 inch hole and 9 5/8 inch casing for the surface casing. Please identify consistent well dimensions on these Attachments and EPA form and identify any corrections to the cement calculation for cementing this casing to the surface.

1.1. Clarify the Surface Hole Size

The Surface hole size will be 13 3/8 inch.

1.2. Clarify the Surface Casing Size

The Surface casing size will be 9 5/8 inch.

1.3. Correct the Cement Calculation for cementing the casing to surface.

Cement will be brought to surface.

Provided:

- 1) the annular volume between 9 5/8 inch casing and 13 3/8 inch open hole is 0.4705 cubic ft/ft, and
- 2) cement yield will approximate 1.47, and
- 3) surface casing will be set at 800'; and
- 4) excess at 20%; then

the correct number of sacks of cement will approximate 320.

1.4. Amend and/or replace the Attachments to be consistent.

Please find immediately following this page:

- 1) amended ATTACHMENT F, Figure F14 for MPC 1D, MPC 2D, and MPC 3D showing the correct surface hole, surface casing size, and correct number of sacks of cement, and
- 2) amended ATTACHMENT L, and
- 3) amended ATTACHMENT M.1, re-written to reflect consistency.



MPC 1D (AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825947, -85.323008

VERTICAL WELL OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,124'

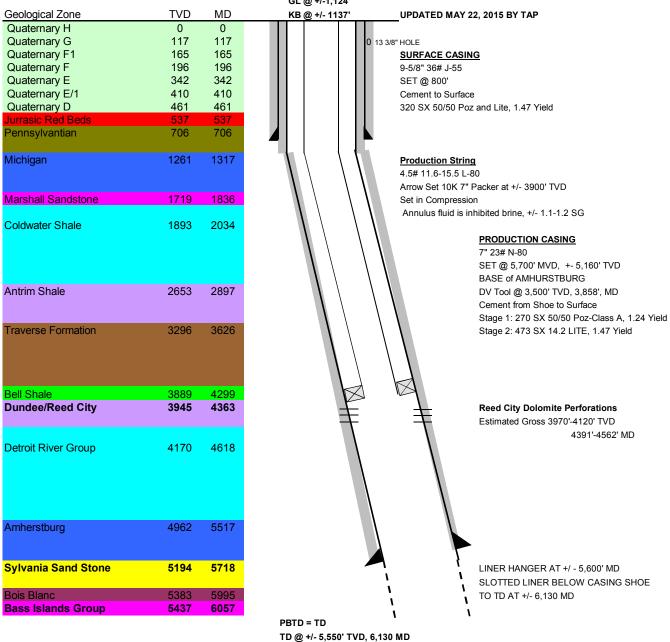
			GL @ +/-1,124 ⁻	
Geological Zone	TVD	MD	KB @ +/- 1,137'	UPDATED AND AMENDED MAY 2015 BY TAP
Quaternary H	0	0		_
Quaternary G	117	117		13 3/8" HOLE
Quaternary F1	165	165		SURFACE CASING
Quaternary F	196	196		9-5/8" 36# J-55
Quaternary E	342	342		SET @ 800'
Quaternary E/1	410	410		
-				Cement to Surface
Quaternary D	461	461		320 SX 50/50 Poz and Lite, 1.47 Yield
Jurrasic Red Beds	537	537	41111	A
Pennsylvantian	706	706		
Michigan	1061	1061		
Michigan	1261	1261		
				8 3/4" HOLE DRILLED TO 5,500' (5,500 TVD)
M	4740	4740		
Marshall Sandstone	1719	1719		PRODUCTION CASING
				7" 23# N-80
Coldwater Shale	1893	1893		SET @ 5,160' MVD, TVD
				BASE of AMHURSTBURG
				DV Tool @ 3,500'
				Cement from Shoe to Surface
				Stage 1: 240 SX 50/50 Poz-Class A, 1.24 Yield
Antrim Shale	2653	2653		Stage 2: 430 SX 14.2 LITE, 1.47 Yield
				,
				Production String
Traverse Formation	3296	3296		4.5# 11.6-15.5 L-80
Traverse i emigrem	0200	0200		Arrow Set 10K 7" Packer at +/- 3900' TVD
				Set in Compression
				Annulus fluid is inhibited brine, +/- 1.1-1.2 SG
				7 1111 112 113 113 113 113 113 113 113 11
Bell Shale	3889	3889		
Dundee/Reed City	3945	3945		
Buildee/Reed Oity	3343	3343		Bood City Dolomite Borforetions
				Reed City Dolomite Perforations Estimated Gross 3970'-4120' TVD
Detroit Diver Crove	4470	4470		Estimated Gross 3970-4120 TVD
Detroit River Group	4170	4170		
Amherstburg	4962	4962		
Sylvania Sand Stone	5194	5194	7	LINER HANGER AT +/ - 5,100'
Cy. Fallia Calla Otolic	3107	0.04	i i	SLOTTED LINER BELOW CASING SHOE
Pois Plans	F202	F202	į į	
Bois Blanc	5383	5383	[TO TD AT +/- 5,550
Bass Islands Group	5437	5437	#	Ŧ
			PBTD = TD	
			TD @ +/- 5,550'	

MPC 2D (AS AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825948, -85.322932 BOTTOM: SW/4 SEC 30, T17N R08W, 43.832871, -85.322873 OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,124'



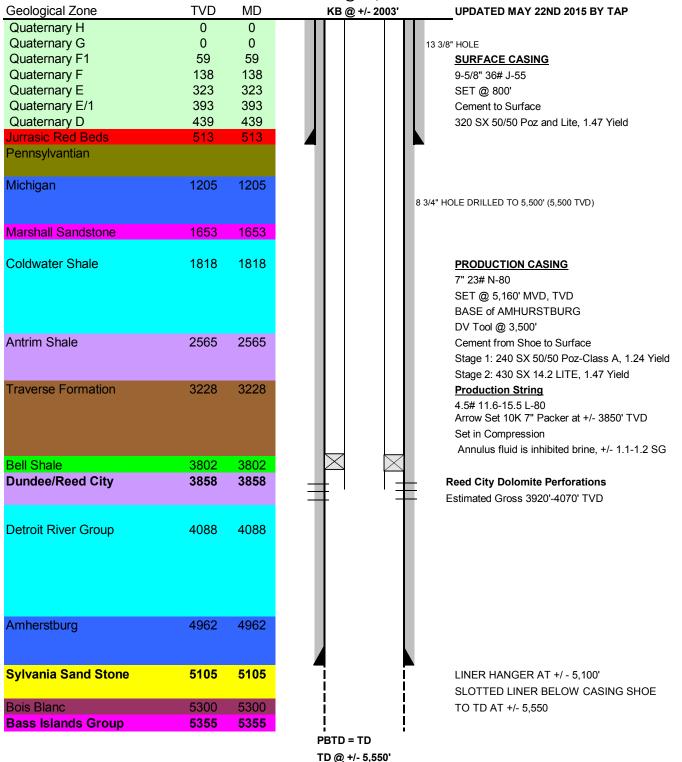
MPC 3D (AMENDED MAY 2015)

SURFACE: NE/4 SEC 36, T17N R09W, 43.818448, - 85.326073

VERTICAL WELL OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,190'





US EPA UIC PERMIT APPLICATION FORM 7520-6 NON HAZARDOUS CLASS I

ATTACHMENT L: CONSTRUCTION PROCEDURES ATTACHEMENT AMENDED MAY 22ND, 2015

IN RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION MAY 11TH, 2015

THE UNITED STATES POTASH PROJECT JANUARY 2015





ATTCHEMENT L.

CONSTRUCTION PROCEDURES (AS AMENDED MAY 22ND 2015) IN RESPONSE TO EPA REQUEST FOR ADDITIONAL INFORMATION MAY 11TH, 2015.

EPA instruction, form 7520-6 (2011):

CONSTRUCTIONPROCEDURES -Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

L.1 Detailed well construction procedures Proposed Mud Program

Surface Hole (0' – 800' +/-): The surface hole drilling fluid will consist of an 8.4 - 9.0 ppg fresh water spud mud formulation with 28-36 viscosity units with fluid loss control as necessary to reach the base of the glacial till. Limit total solids to 4-6%.

Production Hole (800'+/- to TD 5,550'): The production hole drilling fluid will consist of a 9.0 - 9.6+ ppg water based mud system with 40-50 viscosity units and less than 25 fluid loss units. At +/- 4080, a low water loss system should be used to TD.

Drill Stem Tests

A DST in the Reed City Dolomite and A DST in the Sylvania Sandstone and A DST in the Bass Island Group.

Deviation Checks

Every 750' of drill depth a deviation survey shall be performed. More frequently if the deviation angle goes beyond the planned allowance.

Open Hole Logs

Surface Cashing: Resistivity, Spontaneous Potential, Caliper and GR.

Production Casing: Resistivity, Spontaneous Potential, Neutron Density, Compensated Formation Density, Gamma Ray, Caliper, Photo-Electric Effect, Multi-pad Micro Resistivity (i.e. Dip-meter-Fracture Finder), Borehole volume analysis

Cased Hole Logs

Surface Cashing: cement bond log, variable density log with collar locator, and temperature log

Production Casing: A state of the art, cement bond log variable density log, and collar locator will be run from total depth to surface. The depth of the casing is checked using a collar locator log to locate the marker joint. Before any injection commences, a baseline temperature log will also be run, so that comparative analysis can be performed following the commencement of injection.



Detailed Drilling Procedure

The proposed injection wells will be drilled and cased according to the following detailed construction procedure:

- 1. Line locate. Prepare footprint.
- 2. Provide 24 hour notice of move in rig up to all regional, State, and Federal authorities.
- 3. Report expected SPUD.
- 4. Permit will be on location at all times.
- 5. Drive 16" conductor to 100'.
- 6. Move in Rig Up Drilling Unit.
- 7. Drill rat hole and mouse hole.
- 8. Notify all regional, State and Federal authorities with SPUD report.
- 9. Mix fresh water mud and with 40-50 funnel viscosity and 8.4-9.0 lb/gal weight, or as dictated.
- 10. Initiate surface drilling with 13 3/8" rock bit. Catch samples from 0-600', every 50' and bag.
- 11. At 800' KB, Trip out of hole while standing back. Run open-hole logs. Pick up and run in hole with 9 5/8" 36# K-55 STC casing. +/- 7 centralizers installed midway on every second joint. Weld bottom joints. Set and Cement according to cement design. Expect +/- 20 bbl MUD FLUSH, 320 SX 50/50 Poz Premium and Lite, 1.47 Yield, designed with 20% Excess.
- 12. Bump plug and wait on cement.
- 13. Nipple up 9 5/8" casing spool. Nipple up 3000# hydraulic annular preventer, 5K Blow out preventer, pipe over blinds, and choke manifold. Test.
- 14. Pick up 8 3/4" Tri-Cone Rock bit, crows foot (pump through check plug), 12 x 6 ½" drill collars, change over, drill pipe (Portions of bottom hole assembly subject to design change). Trip into plug and trip out while standing back. Run cased hole logs for surface casing.
- 15. Inspect and test pipe rams. Move in rig up Service Mud.
- 16. Trip in hole with bottom hole assembly and drill through surface shoe and test.
- 17. At the appropriate depth as determined by mud logging, Move in rig up testers. Trip out of hole while standing back.
- 18. Pick up drill stem testing tool and run in hole. Drill stem test the proposed injection horizons, 60 minute flow-120 minute shut-60 minute flow-90 minute shut. Catch fluid samples and analyze. Rig down move out testers.
- 19. Proceed to drill to 5,550' Total Vertical Depth, Total Depth will be +/- 5,500', which is across all injection horizons.
- 20. At Total Depth, pull off bottom 1 stand and circulate. Make long short trip.
- 21. Condition well for Open Hole Logs.
- 22. Trip out of hole while laying down drill pipe and Bottom hole assembly.
- 23. Mover in rig up wireline service. Run open hole suite. Rig down move out wireline service.
- 24. Move in rig up casing crew. Pick up and Run in hole with 7" guide shoe, short joint, 7" float collar, 7" x 5.5" liner hanger, 7" 29#-23# N-80 or equivalent API grade LTC production casing to surface. Run centralizers every other joint from Total Depth to +/- 3000' True Vertical Depth. Weld bottom 5 Joints. Run DV Tool at +/- 3500,' so as to bring cement to surface.
- 25. Move in rig up cement services.
- 26. Haul in biocide treated fresh water for cement displacement.
- 27. Cement the production casing as per the design proposal while reciprocating.
 Stage 1: 20 SX Mud flush, 240 SX 50/50 Poz Premium-Class A Premium, 1.24 Yield, designed



- with 20% Excess. Work Casing and Open DV tool, Stage 2: 430 SX 14.2 LITE Premium, 1.47 Yield, designed with 20% Excess Stage 2 Top of cement: Surface.
- 32. Drop the plug and displace cement.
- 31. Rig down move out casing crew. Rig down move out cement services.
- 32. Set casing cap.
- 33. Rig down move out Drilling Unit.

Completion

- 34. Set rig anchors. Move in rig up service unit. Spot power swivel and rig tank. Nipple up blow out preventer, pipe over blinds.
- 35. Pick up 6 3/4" blade bit, cross over and 2 7/8" 6.4# tubing. Pick up power swivel. Drill out the DV tool and run to Total depth.
- 36. At Total depth, spot and wash and displace 1,000 gallons of dilute HCl as per stimulation procedure. Trip out of hole while standing back. Lay down drill bit.
- 37. Mover in rig up wireline. If necessary, Pick up and Run in hole with wireline set, tubing retrievable bridge plug. Set above liner hanger. Fill hole with fluid.
- 38. Run Cement bond long, variable density log, casing collar locator log.
- 37. Pick up straddle packer and Run in hole to Open Hole. Pump additional HCl as per stimulation procedure.
- 38. Run formation parting test and injection test as follows:
 - a. Install a calibrated 3,000 psi pressure gauge and recorder on the discharge line of the pump.
 - b. Pump water into well at a slow rate and obtain a stabilized injection pressure. Record rates, pressures, and time duration of entire test,
 - c. Increase injection rate slightly and keep pumping until a stabilized pressure is obtained. Continue this incremental pumping until formation parting is recognized. At that time, the rate of injection will increase rapidly with a slight increase in pressure.
 - d. Plot data and determine formation parting pressure.
 - e. After establishing the parting of formation, run three or more injection tests at different stabilized rates and pressures below the parting pressure.
- 39. Conduct pressure fall-off test. After injection test is completed, shut well in and record the pressure until a stabilized pressure is obtained, or pressure drops below zero gauge pressure. If it is below zero gauge pressure, measure the fluid level. If test results prove unsatisfactory, additional stimulation may be done to improve the effective permeability at the well bore. This may include additional acid treatment.
- 40. Pick up and repeat 36-39 over the Sylvania Sandstone.
- 41. Trip out of hole while standing back. Pick up slotted liner and run in hole and land.
- 42. Trip out of hole while laying down 2 7/8" tubing.
- 43. Pick up 4.5" 10' tailpipe, Seating nipple, change over, 7" 10K Arrowset full bore packer, 10' pup joint, Seating nipple, 4.5" 11.6# tubing and Run in hole to +/- 5090' KB.



- 44. Displace casing fluid with annulus fluid.
- 45. Set packer in compression.
- 46. Test casing and packer seal.
- 47. Nipple down blow out preventer. Nipple up 7" 5K x 4.5" wellhead.
- 47. Rig down move out service unit.

Please refer to Figure F14 for a well schematic of the proposed injection well.

48. Establish Injection sustained injection rate for the Bass Island Dolomite and Sylvania Sandstone.

Contingent or completion detail accessing the Reed City Dolomite:

- 49. In the event that the Bass Island Dolomite and Sylvania Sandstone do not receive adequate disposal volumes, move in rig up service unit.
- 50. Nipple down wellhead. Nipple up blow out preventer and stripping rubber.
- 51. Release 10K Arrowset packer and trip out of hole while standing back.
- 52. Move in rig up wire-line perforating services. Run in hole and run gamma-ray, casing collar locator. Perforate the Reed City Dolomite at net fottage as determined via the openhole log at the highest indicated neutron density and cleanest photo-electric indication, as per the following approximate gross footage (for each of the proposed wells), subject to open hole confirmation:

For the MPC 1D and MPC 2D

Formation	Gross Top TVD	Gross Btm TVD	SPF	Phase	EHD	Pen	Net	Gross
Reed City Dolomite	3970	4120	2	120D	.44	40"	TBD	150'

For the MPC 3D

Formation	Gross Top TVD	Gross Btm TVD	SPF	Phase	EHD	Pen	Net	Gross
Reed City Dolomite	3920	4070	2	120D	.44	40"	TBD	150'

- 53. Rig down move out wireline. Trip in hole with retrievable bridge plug and packer. Set retrievable bridge plug at +/- 5050 TVD, but above the liner hanger.
- 54. Pull up hole and set 10K arrowset packer. Spot 1000 gallons 15% Hcl into perforations to establish communication.
- 55. Run formation parting test and injection test as follows:
 - a. Install a calibrated 3,000 psi pressure gauge and recorder on the discharge line of the pump.
 - b. Pump water into well at a slow rate and obtain a stabilized injection pressure. Record rates, pressures, and time duration of entire test,





- c. Increase injection rate slightly and keep pumping until a stabilized pressure is obtained. Continue this incremental pumping until formation parting is recognized. At that time, the rate of injection will increase rapidly with a slight increase in pressure.
- d. Plot data and determine formation parting pressure.
- e. After establishing the parting of formation, run three or more injection tests at different stabilized rates and pressures below the parting pressure.
- 56. Conduct pressure fall-off test. After injection test is completed, shut well in and record the pressure until a stabilized pressure is obtained, or pressure drops below zero gauge pressure. If it is below zero gauge pressure, measure the fluid level. If test results prove unsatisfactory, additional stimulation may be done to improve the effective permeability at the well bore. This may include additional acid treatment.
- 57. Establish injection rate into the Reed City Dolomite. Release Packer. Release retrieve bridge plug.
- 58. Round trip and set packer at +/- 3900', which will be within 50' of the top perforation of the Reed City Dolomite.

L.2 Timetable for drilling, logging and formation testing

Anticipated timing for drilling is permit dependent.

Drill time, following spud, will approximate 12 days for drilling and casing, 3 days for formation testing for fluid recovery, and 1 day for open hole logging. This is a total anticipated time of sixteen days per well.

L.3 Open hole and cased hole logs

As per Section L.1, re-stated here.

Open Hole

Surface Cashing: Resistivity, Spontaneous Potential, Caliper and GR.

Production Casing: Resistivity, Spontaneous Potential, Neutron Density, Compensated Formation Density, Gamma Ray, Caliper, Photo-Electric Effect, Multi-pad Micro Resistivity (i.e. Dip-meter-Fracture Finder), Borehole volume analysis

Cased Hole

Surface Cashing: cement bond log, variable density log with collar locator, and temperature log

Production Casing: A state of the art, cement bond log variable density log, and collar locator will be run from total depth to surface. The depth of the casing is checked using a collar locator log to locate the marker joint. Before any injection commences, a baseline temperature log will also be run, so that comparative analysis can be performed following the commencement of injection.



L.4 Mechanical integrity testing (cement bond logs, radioactive tracer log, and temperature, noise or oxygen activation log are required)

All required logs will be run at before any perforations are added to the casing and before fluid injection commences.

The mechanical integrity of all the proposed injection wells will be tested according to the requirements of 40 CPR 146.8 to demonstrate that (1) there are no significant leaks in the casing, tubing, or packer and (2) there is no significant fluid movement into a USDW through vertical channels adjacent to the injection wellbores. As required by permit, mechanical integrity tests shall be conducted at the required frequency, and especially before any injection commences. The timing of these test shall be dictated according to pro-active best practice.

Required tests include:

- 1) an approved pressure test in accordance with 40 CFR 146.8(b)(1) [annually];
- 2) an approved radioactive tracer survey [every five years]; and
- 3) an approved temperature, noise, oxygen activation or other approved log [every five years];
- or 1,2, & 3 above as otherwise directed by permit.

Gauges used in performance of the MIT will be calibrated to an accuracy of not less than 0.5 percent of fullscale prior to field use. A copy of the calibration certificate will be submitted to USEPA each time the gauge is calibrated.

Notice will be made to the USEPA and the MDEQ at least thirty days prior to the date of the schedule MIT. Tests must be witnessed by a representative of the USEPA and/or MDEQ. A written report of the results of the MIT will be made to the USEPA within 45 days following completion of the MIT.

L.5 Buffer fluid and volume, if any

Initially, the annular space between the injection tubing and casing in the injection wells will be displaced with a quantity of inhibited brine.





US EPA UIC PERMIT APPLICATION FORM 7520-6 NON HAZARDOUS

CLASS I

ATTACHMENT M: CONSTRUCTION DETAILS ATTACHEMENT AMENDED MAY 22ND, 2015

IN RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION MAY 11TH, 2015

THE UNITED STATES POTASH PROJECT JANUARY 2015



ATTCHEMENT M. CONSTRUCTION DETAILS

EPA instruction, form 7520-6 (2011):

CONSTRUCTION DETAILS - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

The following information should be included in well schematics and/or tables, Cement volumes will be slightly greater for the MPC 2D, whereby, the calculated cement volumes for the MPC 2D can be referenced on the proposed wellbore diagram, Figure 14:

M.1 Construction of well, including total depth, completion type, casing sizes, types, weights, and setting depths

Casing and Cement Design

Casing	Hole Size	Casing OD	Weight	Grade	Thread	Set at
Conductor	20"	16"	65#	H-40	STC	100'
Surface	13 3/8"	9 5/8"	36"	J-55	STC	800'

Cemented With = 320 SX 50/50 Poz and Lite, 1.47 Yield, designed with 20% Excess

To Estimated TOC = Surface

Casing	Hole Size	Casing OD	Weight	Grade	Thread	Set at
Production	8 3/4"	7"	23#, 26#, 29#	J-55,L-80	LTC	5,160'
DV Tool		7"				3,500
Slotted Liner	8 3/4"	5.5"				5,550'

Cemented With = Stage 1: 240 SX 50/50 Poz-Class A, 1.24 Yield, designed with 20% Excess

Stage 1 TOC: 3,500'

Stage 2: 430 SX 14.2 LITE, 1.47 Yield, designed with 20% Excess

Stage 2 TOC: Surface

M.2 Cement type and amount for all casing

Please refer to Section M.1 and to Figure L.1-1.

M.3 Tubing and packer specifications, including size, type, and setting depths

Tubing Size 4-1/2 inch
Tubing Type J-55, LT&C
Coating TK69 epoxy
Tubing Weight 11.6#/ft

Packer Arrowset 10K set at 5090', tail pipe to 5,100'



M.4 Wellhead construction details

MI POTASH WELLHEAD CONSTRUCTION INJECTION WELL Osceola County, MI

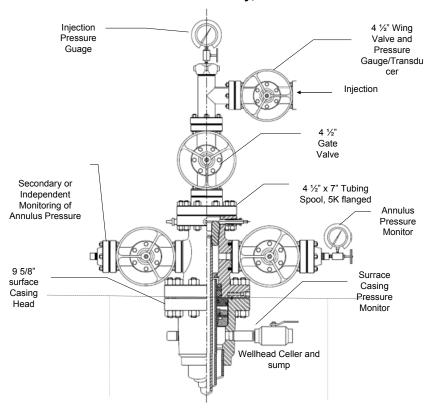


FIGURE M1.

Well Area

The well head will be surrounded by a concrete and steel sump. This sump will drain by gravity through a pipeline into a sump within the test mining facility processing building, where any leakage will be captured by a sump pump and re-injected into the circulating fluid system.

M.5 Location of sample tap and female coupling for independent determination of annulus pressure

Please refer top Figure M1.



EPA request for Additional Information (May 2015):

2. The permit application for the three wells requests injection into the Reed City Dolomite, the Sylvania Sandstone, and the Bass Island Dolomite. Injection into the Sylvania Sandstone and the Bass Island Dolomite is identified through an open hole well construction. However, the permit application does not give detailed information on how the Reed City Dolomite will be accessed through all three wells. Attachment L.4 of the application generally identifies that the wells will be perforated and Attachment F.2 identifies that access to the Reed City Dolomite will only be made if the Sylvania Sandstone and Bass Island Dolomite will not accept fluid at the proposed volumes.

Please identify the detailed construction procedures for accessing the Reed City Dolomite through the three wells. This information should also identify that the Reed City will only be accessed if the Sylvania and Bass Island formations will not accept the proposed fluid volumes. Parts of the application that need to contain this information are the diagrams and descriptions in Attachments F, L, Q, and page 1 and 2 (for all three wells) of EPA Form 7520-14 "Plugging and Abandonment Plan". Please also note that the packer locations for each proposed well configuration (i.e., open hole and perforations) must be identified in the diagrams and descriptions identified above. EPA Region 5 requires that the packer be placed within 100 feet of the injection formation top.

2.1 Identify the detailed construction procedures for accessing the Reed City Dolomite. This information should also identify that the Reed City will only be accessed if the Sylvania and Bass Island formations will not accept the proposed fluid volumes. Also clarify contingent Packer location provided the Reed City Dolomite is accessed.

Please see amended ATTACHEMENT L (Part 1.4), for detailed construction procedures on how the Reed City Dolomite will be accessed.

In Summary,

The Reed City Dolomite will be accessed via perforations, in the event the Bass Island Dolomite and Sylvania Sandstone do not accept fluid at the proposed volumes as per F.2, as referenced above.

Perforations will be selected based on open hole logging results, and therefore are currently reported as gross estimated depths in the injection interval. A projected gross perforated interval will be similar at all three wells, true vertical depth, and are reflected in *Amended Attachment F*, *Figure F14* for all three wells

The packer will be set within 50' of the top of the Reed City Dolomite perforations.





2.2 Amend and/or replace the Attachments F, L, Q and EPA Form 7520-14 to be consistent with the requested information showing access to the Reed City Dolomite.

Please see the referenced Amended ATTACHEMENTS made a part of Section 1.0 and 2.0, that clarifies the requested information, specifically as it pertains to the access and proper plugging and abandonment of the Reed City Dolomite:

- 1) amended figures to ATTACHMENT F, (Part 1.4), corrected wellbore diagrams, showing access to the Reed City Dolomite
- 2) amended ATTACHMENT L, (Part 1.4), corrected well construction details, including detail as it concerns access to the Reed City Dolomite
- 3) amended figures to ATTACHMENT Q, corrected wellbore diagrams, and plugged wellbore diagrams, showing the Reed City Dolomite as perforated and plugged, and
- 4) amended EPA Form 7520-14, showing the Reed City Dolomite as perforated and plugged.

The material procedures and projected cement volumes for abandonment will not change, since cement must be brought to surface in the production casing; and therefore, the cost to abandon is not affected.



MPC 1D (AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825947, -85.323008

VERTICAL WELL OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,124'

			GL @ +/-1,124 ⁻	
Geological Zone	TVD	MD	KB @ +/- 1,137'	UPDATED AND AMENDED MAY 2015 BY TAP
Quaternary H	0	0		_
Quaternary G	117	117		13 3/8" HOLE
Quaternary F1	165	165		SURFACE CASING
Quaternary F	196	196		9-5/8" 36# J-55
Quaternary E	342	342		SET @ 800'
Quaternary E/1	410	410		
-				Cement to Surface
Quaternary D	461	461		320 SX 50/50 Poz and Lite, 1.47 Yield
Jurrasic Red Beds	537	537	41111	A
Pennsylvantian	706	706		
Michigan	1061	1061		
Michigan	1261	1261		
				8 3/4" HOLE DRILLED TO 5,500' (5,500 TVD)
M	4740	4740		
Marshall Sandstone	1719	1719		PRODUCTION CASING
				7" 23# N-80
Coldwater Shale	1893	1893		SET @ 5,160' MVD, TVD
				BASE of AMHURSTBURG
				DV Tool @ 3,500'
				Cement from Shoe to Surface
				Stage 1: 240 SX 50/50 Poz-Class A, 1.24 Yield
Antrim Shale	2653	2653		Stage 2: 430 SX 14.2 LITE, 1.47 Yield
				,
				Production String
Traverse Formation	3296	3296		4.5# 11.6-15.5 L-80
Traverse i emigrem	0200	0200		Arrow Set 10K 7" Packer at +/- 3900' TVD
				Set in Compression
				Annulus fluid is inhibited brine, +/- 1.1-1.2 SG
				7 1111 112 113 113 113 113 113 113 113 11
Bell Shale	3889	3889		
Dundee/Reed City	3945	3945		
Buildee/Reed Oity	3343	3343		Bood City Dolomite Porferations
				Reed City Dolomite Perforations Estimated Gross 3970'-4120' TVD
Detroit Diver Crove	4470	4470		Estimated Gross 3970-4120 TVD
Detroit River Group	4170	4170		
Amherstburg	4962	4962		
Sylvania Sand Stone	5194	5194	7 .	LINER HANGER AT +/ - 5,100'
Cy. Fallia Calla Otolic	3107	0.04	i i	SLOTTED LINER BELOW CASING SHOE
Pois Plans	F202	F202	į į	
Bois Blanc	5383	5383	[TO TD AT +/- 5,550
Bass Islands Group	5437	5437	#	Ŧ
			PBTD = TD	
			TD @ +/- 5,550'	

MPC 1D (AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825947, -85.323008

VERTICAL WELL

OSCEOLA COUNTY, MI

P & A WELLBORE DIAGRAM GL @ +/-1,124'

			GL @ +/-1,124'	
	TVD	MD	KB @ +/- 1137'	UPDATED JULY 11TH 2014 BY TAP
Quaternary H	0	0		II -
Quaternary G	117	117	_	13 3/8" HOLE
Quaternary F1	165	165	_	SURFACE CASING
Quaternary F	196	196	_	9-5/8" 36# J-55
Quaternary E	342	342	_	SET @ 800'
Quaternary E/1	410	410	_	Cement to Surface
Quaternary D	461	461	_	320 SX 50/50 Poz and Lite, 1.47 Yield
Jurrasic Red Beds	537	537	4	320 3X 30/30 F 02 and Lite, 1.47 Field
Pennsylvantian	706	706		Lowest USDW at 550', behind surface casing.
Cilisyivantian	700	700		Lowest OSDW at 330, bellifit surface casing.
Michigan	1261	1261		
Michigan	1201	1201	_	0.0/W.LIOLE DDW.LED TO 5.5001/5.500 T/D)
				8 3/4" HOLE DRILLED TO 5,500' (5,500 TVD)
Marshall Sandstone	1710	1710		
Marshall Sanusione	1719	1719		
Calduratas Chal-	4000	4000		
Coldwater Shale	1893	1893		
			_	
			_	
Antrim Shale	2653	2653	_	PRODUCTION CASING
			_	7" 23# N-80
			_	SET @ 5,160' MVD, TVD
Traverse Formation	3296	3296	_	DV Tool @ 3,500'
			_	Cement from Shoe to Surface
			_	Stage 1: 240 SX 50/50 Poz-Class A, 1.24 Yield
				Stage 2: 430 SX 14.2 LITE, 1.47 Yield
Bell Shale	3889	3889		
Dundee/Reed City	3945	3945	4 7	Reed City Dolomite Perforations
				Estimated Gross 3970'-4120' TVD
	3970-4120 T	'VD		Upon placing Cement Plug, hesitate into perforation
Detroit River Group	4170	4170	_	
				Plug Cement from Retainer to Surface
			_	775 SX Class A, Neat from Cmt Retiainer to Surface
				1.47 Yield
Amherstburg	4962	4962		
				Cement Retainer @ 5,130'
Sylvania Sand Stone	5194	5194		
J. Tallia Galla Gloric	0104	0.04		Squeeze 175 SX Class A, Neat below Cmt Retainer
Bois Blanc	5383	5383		1.47 Yield at 130%.
	5363 5437			1.47 Yield at 130%. #
Bass Islands Group	3437	5437		"
			PBTD = TD	
			TD @ +/- 5,550'	

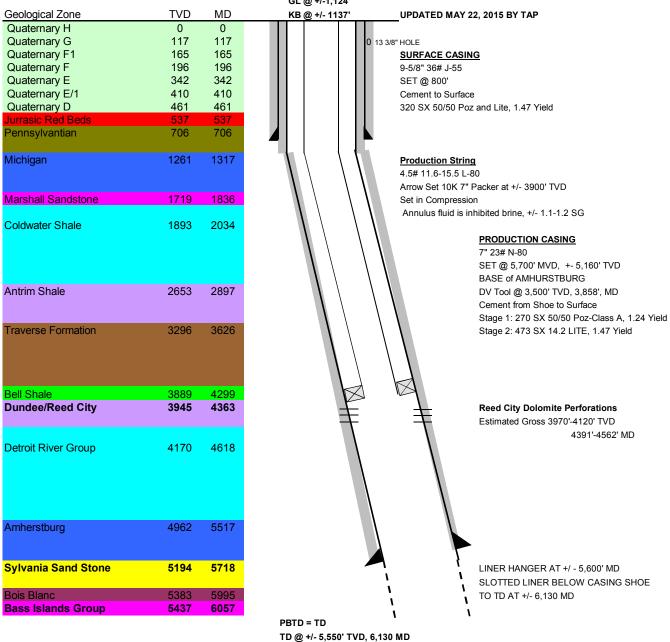
Figure 14. P & A

MPC 2D (AS AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825948, -85.322932 BOTTOM: SW/4 SEC 30, T17N R08W, 43.832871, -85.322873 OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,124'



MPC 2D (AS AMENDED MAY 2015)

SURFACE: NW/4 SEC 31, T17N R08W, 43.825948, -85.322932 BOTTOM: SW/4 SEC 30, T17N R08W, 43.832871, -85.322873

OSCEOLA COUNTY, MI

PLUGGED WELLBORE DIAGRAM

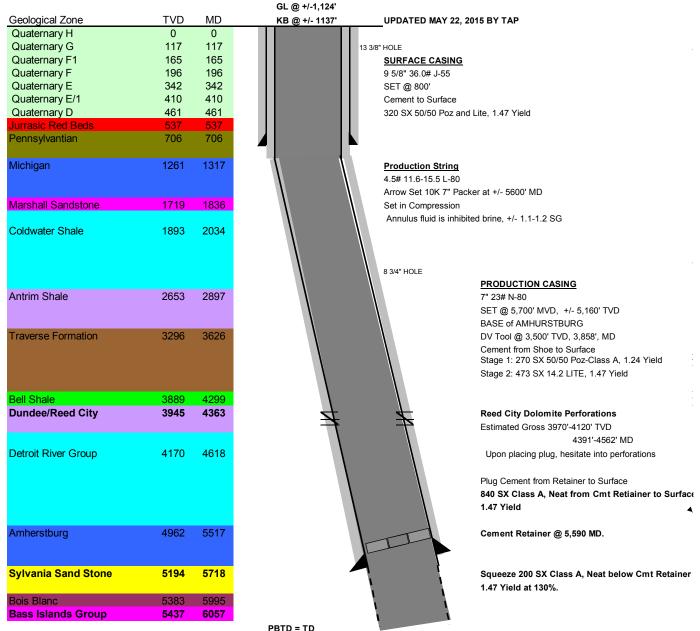


FIGURE F14. P & A.

TD @ +/- 5,550' TVD, 6,130 MD

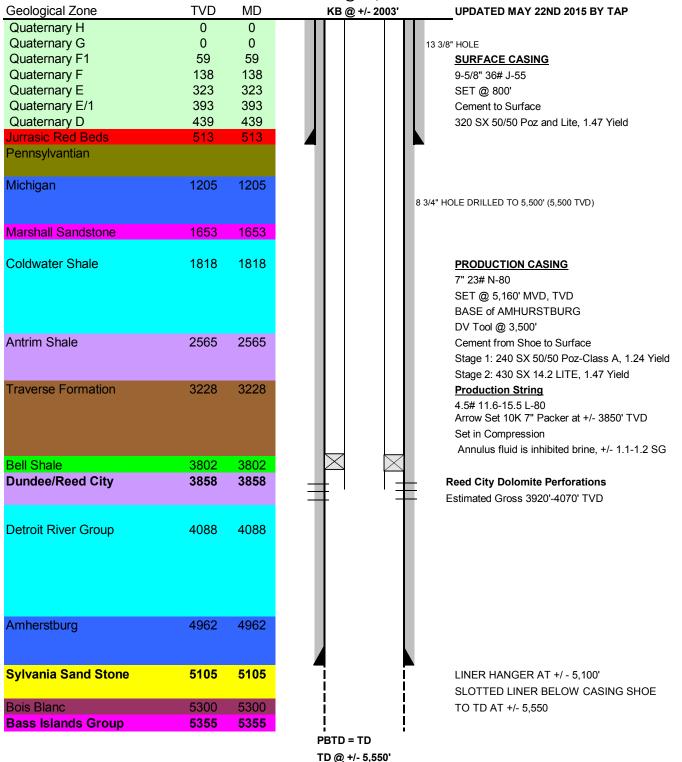
MPC 3D (AMENDED MAY 2015)

SURFACE: NE/4 SEC 36, T17N R09W, 43.818448, - 85.326073

VERTICAL WELL OSCEOLA COUNTY, MI

PROPOSED WELLBORE DIAGRAM

GL @ +/-1,190'



MPC 3D

SURFACE: NE/4 SEC 36, T17N R09W, 43.818448, -85.326073

VERTICAL WELL

OSCEOLA COUNTY, MI

PLUGGED WELLBORE DIAGRAM

GL @ +/-1,190' TVD MD **UPDATED MAY 22ND 2015 BY TAP** KB @ +/- 2003' Quaternary H 0 0 0 Quaternary G 0 13 3/8" HOLE 59 59 SURFACE CASING Quaternary F1 Quaternary F 138 138 9-5/8" 36# J-55 Quaternary E 323 323 SET @ 800' Quaternary E/1 393 393 Cement to Surface Quaternary D 439 439 320 SX 50/50 Poz and Lite, 1.47 Yield Jurrasic Red Beds Pennsylvantian Lowest USDW at 550', behind surface casing. 1205 1205 Michigan 8 3/4" HOLE DRILLED TO 5,500' (5,500 TVD) Marshall Sandstone 1653 1653 Coldwater Shale 1818 1818 Antrim Shale 2565 2565 PRODUCTION CASING 7" 23# N-80 SET @ 5,160' MVD, TVD 3228 3228 Traverse Formation DV Tool @ 3,500' Cement from Shoe to Surface Stage 1: 240 SX 50/50 Poz-Class A, 1.24 Yield Stage 2: 430 SX 14.2 LITE, 1.47 Yield Bell Shale 3802 3802 **Dundee/Reed City** 3858 3858 **Reed City Dolomite Perforations** Estimated Gross 3920'-4070' TVD Upon placing Cement Plug, hesitate into perforations **Detroit River Group** 4088 4088 Plug Cement from Retainer to Surface 775 SX Class A, Neat from Cmt Retiainer to Surface 1.47 Yield Amherstburg 4962 4962 Cement Retainer @ 5,130' **Sylvania Sand Stone** 5105 5105 Squeeze 175 SX Class A, Neat below Cmt Retainer Bois Blanc 5300 5300 1.47 Yield at 130%. **Bass Islands Group**

Figure 14. P & A

PBTD = TD TD @ +/- 5,550'

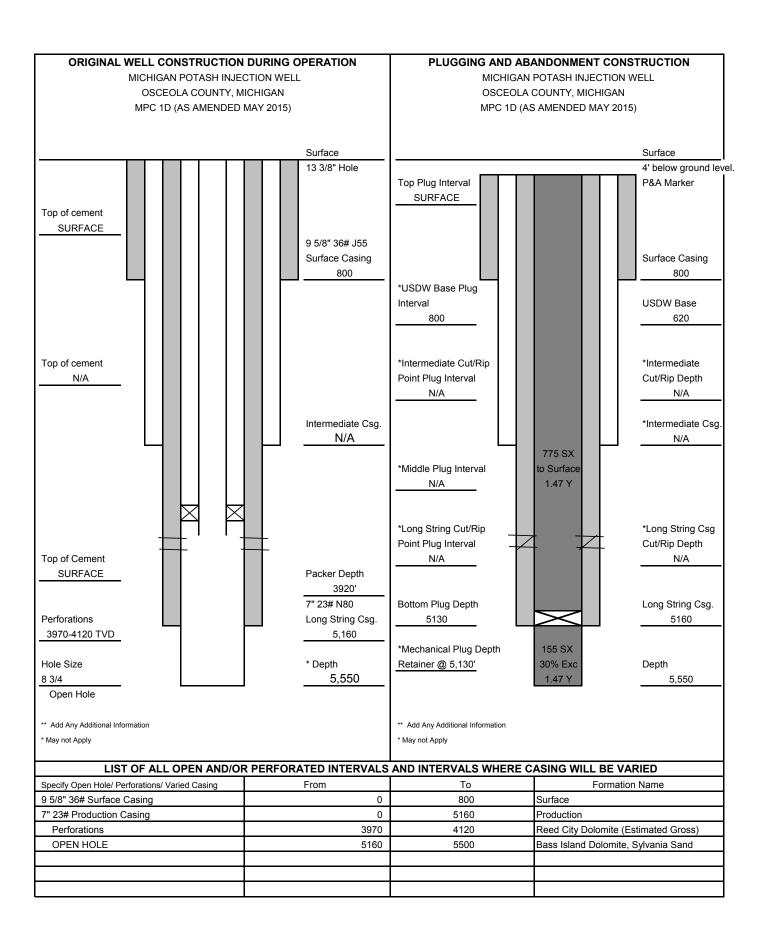
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United States Environmental Protection Agency Washington, DC 20460

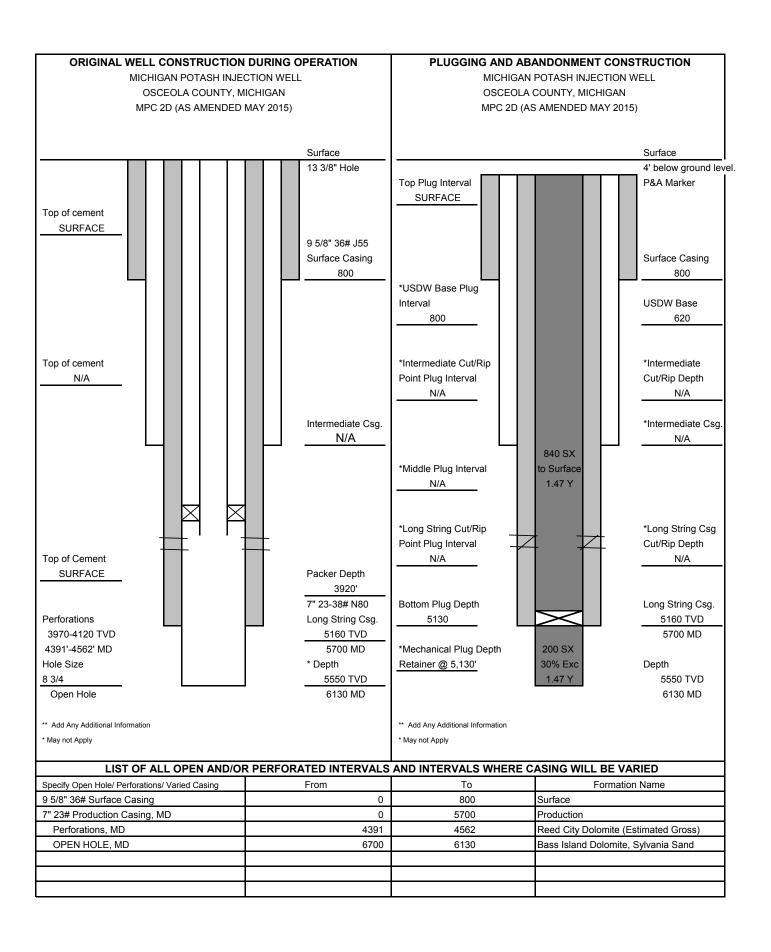
PLUGG	ING AN	D ABA	NDON	MENT PL	AN						
Name and Address of Facility			Name and Address of Owner/Operator								
MPC 1D				otash Operati							
			1225 17th	Street, Suite 22	200, Denver	, CO 80215					
Leaste Well and Outline Unit on	State	L		County		Permit I	Number				
Locate Well and Outline Unit on Section Plat - 640 Acres	Michiga	n		Osceola							
 N	Surface L	rface Location Description									
	se 1/4 c	1/4 of \underline{sw} 1/4 of \underline{nw} 1/4 of \underline{nw} 1/4 of Section $\underline{31}$ Township $\underline{17}$ Range $\underline{8}$									
	Locate we	cate well in two directions from nearest lines of quarter section and drilling unit									
	Surface										
	Location	1051 LEDM N									
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	Number	of Wells	1			nhanced Red					
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S					CLAS						
,	Lease Nai	me			Well Numb	er MPC 11)				
CASING AND TUBING RECORD AFT	ER PLUGGING	;		METH	OD OF EMPL	ACEMENT O	F CEMENT PI	LUGS			
SIZE WT (LB/FT) TO BE PUT IN WELL (FT) TO	BE LEFT IN W	ELL (FT)	HOLE SIZ	E The	e Balance Me	thod					
9 5/8 36 800 800		13 3/8 The Dump Bailer Method									
7 23-28 5160 516	50		8 3/4	The	e Two-Plug M	ethod					
		✓ Other									
					1 1			ı			
CEMENTING TO PLUG AND ABANDON DATA:		PLUG #	1 PLUG #	2 PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7			
Size of Hole or Pipe in which Plug Will Be Placed (inche Depth to Bottom of Tubing or Drill Pipe (ft BOTTOM OF		8 3/4" 5500	5130								
Sacks of Cement To Be Used (each plug)	1100(0)	155	775								
Slurry Volume To Be Pumped (cu. ft.)		228	1140								
Calculated Top of Plug (ft.)		5130	0								
Measured Top of Plug (if tagged ft.)		5130	0								
Slurry Wt. (Lb./Gal.)		14.2	14.2								
Type Cement or Other Material (Class III)		A	A								
LIST ALL OPEN HOLE AND/OR PERF	ORATED INTE	RVALS A	ND INTERVA	LS WHERE CAS	ING WILL BE	VARIED (if a	ny)				
From	То			From			То				
5160 Open hole 5550 Open Hole	e										
3970 Reed City Perfs (Est.Gross) 4120 Reed City	Perfs (Est.G	ross)									
Estimated Cost to Plug Wells											
\$ 30,400											
Certification I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all											
attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibliity of fine and imprisonment. (Ref. 40 CFR 144.32)											
Name and Official Title (Please type or print)	Sigr	ature	0				Date Signed				
Theodore A. Pagano, P.E., P.G., General Manager			1				05/22/2014	1			





United States Environmental Protection Agency Washington, DC 20460

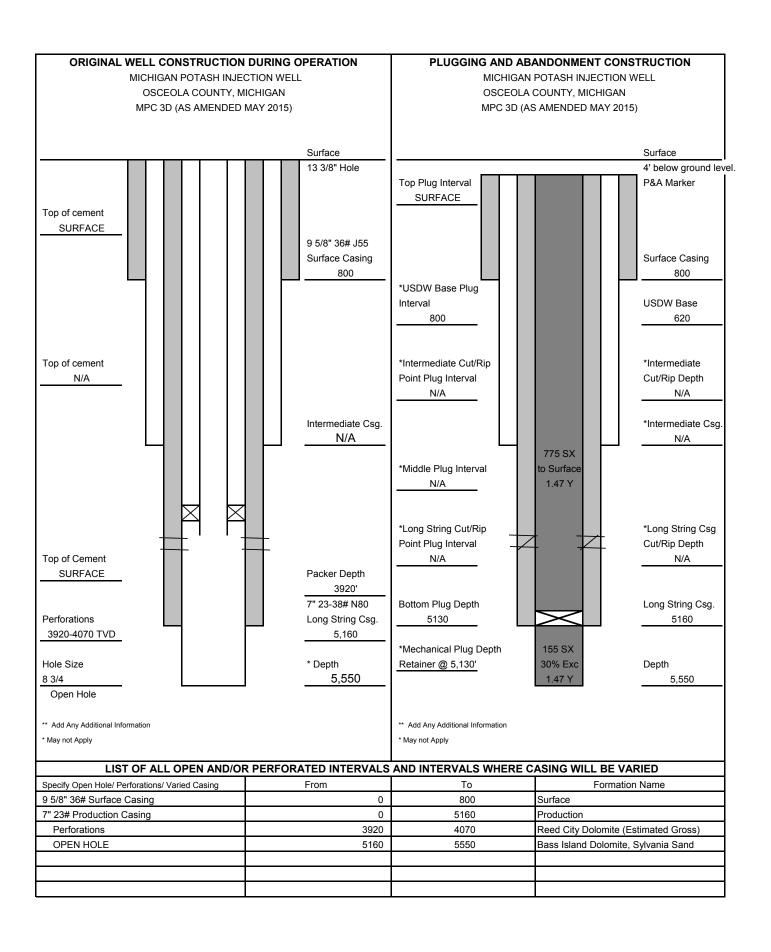
W.E	PLUGGING AND ABANDONMENT PLAN														
Name ar	d Address of Fa	acility				N	lame	and Addr	ess of Owner	r/Operator					
MPC 2	2D						Michigan Potash Operating, LLC c/o Fox Rothschild 1225 17th Street, Suite 2200, Denver, CO 80215								
					State			Co	ounty		Permit Number				
	cate Well and O ction Plat - 640 A				Michiga	ın			Sceola						
<u> </u>	301011 1 lat - 040 A				Surface L	urface Location Description									
	 	N I			se 1/4 c	2 1/4 of SW 1/4 of NW 1/4 of NW 1/4 of Section 31 Township 17 Range 8									
	<u> </u>	_				cate well in two directions from nearest lines of quarter section and drilling unit									
	o		_		Surface										
					Location	cation ft. frm (N/S) N Line of quarter section $1050{}^{\circ}$ FRM ${ m N}$									
	<u> </u>	╌┞╌┼╌╎	-+-1		and	ft. from (E	/w) 🔽	V Line	of quarter se	ction. 396	'FRM W				
w	+ + +	1 1		E		TYPE OF	AUTH	ORIZATIO	N			ACTIVITY			
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	iii	_Li_i	i		Numbei	of Wells	1				nhanced Re	-			
	$\overline{1}$		$\neg \neg \neg \mid$								lydrocarbon	Storage			
<u> </u>	1 1 1										SS III				
		S			Lease Na	me				Well Num	ber MPC 2	D			
	CA	SING AND TUE	BING RECO	RD AFTER	PLUGGING	3			METH	OD OF EMPL	ACEMENT O	F CEMENT PI	_UGS		
SIZE	WT (LB/FT)	TO BE PUT I	WELL (FT)	то ве	LEFT IN W	ELL (FT)	но	LE SIZE	The	Balance Me	ethod				
9 5/8	36	800		800		13 3/8 The Dump Bailer Method									
7	23-28	5700		_ 5700		8 3/4 The Two-Plug Method									
									✓ Oth	ner					
										I	1	ı	ı		
Cino of I	CEMENTING Hole or Pipe in v	TO PLUG AND				PLUG #1	1 F	LUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7		
	Bottom of Tub			ottom of	F plug	8 3/4"		590							
-	Cement To Be			Jecom 01	prug	160.00		030							
	olume To Be Pu		<u> </u>			233.00		511.00							
Calculat	ed Top of Plug ((ft.)				5590	0								
Measure	d Top of Plug (i	f tagged ft.)				5590	0								
Slurry V	/t. (Lb./Gal.)					14.2	1	4.2							
Type Ce	ment or Other M	laterial (Class	III)			A	Α								
	LIS	T ALL OPEN H	OLE AND/O	R PERFOR	ATED INTE	RVALS AN	ND IN	ΓERVALS	WHERE CAS	ING WILL BE	VARIED (if a	ny)			
	From			То					From			То			
	VD, 5700 MD				MD open l										
	VD, 4391 MD		4120 TV	D, 4562 N	MD RC* I	Perfs									
*R0	C=Reed City D	olomite													
Estimate	ed Cost to Plug	Wells													
\$ 30,4		WCII3													
Ψ 30,1	00														
at in	ertify under the tachments and formation is tru ossibliity of fine	that, based on e, accurate, ar	my inquiry	of those i	ly examine individuals are that th	immediat	famili ely re	ar with th	e for obtainir	ng the inforn	nation, I belie	eve that the			
Name ar	nd Official Title	(Please type o	or print)		Siar	nature						Date Signed			
	ore A. Pagano,	-		nager									5		





United States Environmental Protection Agency Washington, DC 20460

V L			PLU	GGIN	G AN	D ABA	٩N	DONN	MEN	IT PL	AN				
Name an	d Address of Fa	acility					Name and Address of Owner/Operator								
MPC 3	D					Michigan Potash Operating, LLC c/o Fox Rothschild 1225 17th Street, Suite 2200, Denver, CO 80215									
							122	25 17th S	Street,	Suite 22	200, Denvei	; CO 80215			
Lac	ate Well and O	utlina Unit an			State				Count	у		Permit Number			
	tion Plat - 640 A				Michigan Osceola										
		N			Surface L	urface Location Description									
	1 1 1	 			SW 1/4 c	W 1/4 of <u>SE</u> 1/4 of <u>NE</u> 1/4 of <u>SE</u> 1/4 of <u>SE</u> 1/4 of Section <u>36</u> Township <u>17</u> Range 9									
	ユーレユ-	_ -	_		Locate w	ocate well in two directions from nearest lines of quarter section and drilling unit									
			Surface												
	+				Location	ocation ft. frm (N/S) N Line of quarter section 1168 ' FRM N									
		- - - - -			and	ft. from (E	E/W)	E Lin	e of qu	uarter sec	ction. 442	'FRM E			
w —			E		_	TYPE OF	AUT	THORIZAT	ION			WELL A	CTIVITY		
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	<u> </u>	- - i			=	Permit					CLA				
	+	$ \vdash$ $+$ $ \vdash$	-+		Rule	9						Brine Disposa			
	<u> </u>	_			Number	of Wells	1					inhanced Re lydrocarbon			
												SS III	Storage		
		S										MDC 3	<u> </u>		
					Lease Na						Well Num	oer			
	,	SING AND TUE		1			1			METH	OD OF EMPL	ACEMENT O	F CEMENT PI	LUGS	
SIZE	WT (LB/FT)	TO BE PUT II	N WELL (FT)		EFT IN W	ELL (FT)	The Balance Wethou								
9 5/8	36	800 5160		800		13 3/8 The Dump Bailer Method									
7	23-28	3100		5160		8 3/4 The Two-Plug Method									
						Other									
	CEMENTING	TO PLUG AND	ABANDON DA	TA:		PLUG #	1	PLUG #2	2 PL	LUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7	
Size of F	lole or Pipe in v	which Plug Wi	II Be Placed (i	inche		8 3/4"		7"							
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	nent or Other N	latorial (Class	III)			14.2 A	=	14.2 A	₩						
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	From	T ALL OPEN H	OLE AND/OR	To	ATED INTE	RVALS A	וטאו	INTERVAL	Fro		ING WILL BE	VARIED (II a	To		
5160 O	pen Hole		5550 Open												
	eed City Perfs	(Est.Gross)	4080 Reed		fs (Est.G	ross)									
				,											
	d Cost to Plug	Wells													
\$ 30,40	00														
Certification															
att int	I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibliity of fine and imprisonment. (Ref. 40 CFR 144.32)														
Name an	d Official Title	(Please type o	or print)		Sigr	nature)						Date Signed	l	
Theodo	Theodore A. Pagano, P.E., P.G., General Manager												05/22/2014	1	
					_										



EPA request for Additional Information (May 2015):

- 3. The "Plugging and Abandonment Plan" (EPA Form 7520-14 page 1 and 2) did not contain the following information:
 - a. "Casing and Tubing Record After Plugging" (page 1 of EPA form). This section of the form must identify all proposed casing strings.
 - b. "Depth to Bottom of Tubing or Drill Pipe" (page 1 of EPA form). The bottom of the proposed plugs must be identified in this space.
 - c. "Measured Top of Plug" (page 1 of EPA form). Although the title identifies measure top of plug, an estimation of the plug tops must be entered in the space.
 - d. "List All Open Hole and/or Perforated Intervals ... " (page 1 and 2 of EPA form). Open hole and perforated intervals must be identified. Please submit revised Plugging and Abandonment Plans (EPA Form 7520-14, pages 1 and 2) for all three wells with an authorized signature as set out in 40 C.F.R. §144.32(a)(l) or (2), as applicable.

1.0 Amend and/or replace "Plugging and Abandonment Plan" (EPA Form 7520-14).

Please find EPA Form 7520-14 attached hereto, and referenced in Section 2.2 for the three proposed wellbores



4. Attachment H.2 of the permit application identifies that injection tests were made within the Reed City Dolomite. Results from these tests established a fracture gradient of 1.18 psi per foot and did not result in fracturing the tested formation. For EPA to consider this fracture gradient when calculating the maximum injection pressure for the proposed three wells, Michigan Potash must submit the test data referenced in Attachment H.2 of the application. A scaled map identifying Michigan Potash's three proposed injection wells and the well or wells used in the injection tests must also be submitted with the test results.

4.1 Submit injection test data for the Reed City Dolomite.

The reference data for Attachment H.2 is identified with the following *active* Non-Hazardous Class I injection wells, and can be referenced via Region V permit files as follows:

1995 RE-APPLICATION for underground permit No. MI-133-1I-0001 (The Woodward 1-26): APPENDIX A.

1995 RE-APPLCIATION for underground permit No. MI-133-1I-0002 (The Thomas 1-26): APPENDIX A.

The above described data has been utilized subsequently in the 2006 RE-APPLICATION for both MI-133-1I-0001 (the Woodward 1-26) and MI-133-1I-0002 (the Thomas 1-26), as attached hereby for ease of reference, and on the permit criteria.

4.2 Submit a scaled map identifying Michigan Potash's three proposed injection wells and the well or wells used in the injection tests.

Please see the attached, AMENDED ATTACHEMENT H.2. FIGURE H.2 Map showing Existing Class I NON-HAZARDOUS Injection Wells containing injection falloff and in-situ stress data, the Thomas 1-26 (NW4NW4 Section 26) and the Woodward 1-26 (NE4SW4 Section 26).

Please also see re-attached, ATTACHMENT B, Figure B2, concerning the above referenced wells with in-situ stress data.

4.3 Other applicable information.

As per section 2.1 of this written response, and as per section L.1 (As Amended May 22, 2015, See Section 2.1), Michigan Potash proposes to conduct all the necessary and applicable in-situ stress tests in the event the Reed City Dolomite is accessed via perforations.





PERMIT RE-APPLICATION CLASS I NON-HAZARDOUS INJECTION WELL

WOODWARD 1-26 (MI-133-1I-0001)

MOSAIC POTASH HERSEY, LLC HERSEY, MICHIGAN

formerly Kalium Chemicals, Ltd. IMC Kalium, Ltd. PPG Industries, Inc.

SUBSURFACE PROJECT NO. 60Z5849

REPORT SUBMITTED AUGUST 2006

PREPARED BY

SUBSURFACE TECHNOLOGY, INC. SOUTH BEND, INDIANA

H. OPERATING DATA

H.1 Average and Maximum Injection Rate and Volume

Disposal flow rates vary from a minimum of 90 gallons per minute (129,000 gallons per day) to a maximum of 600 gallons per minute (864,000 gallons per day). The average disposal flow rate for the Woodward Well is 175 gallons per minute (252,000 gallons per day). At any given time, disposal may occur to a single well or to both wells simultaneously.

H.2 Average and Maximum Injection Pressures

The maximum injection pressure has been set by permit at 2,576 psig for the Woodward 1-26 well.

Injection fluid may be water (specific gravity of 1.0) or a partially saturated sodium chloride/potassium chloride brine solution with a specific gravity as high as 1.2.

Previous documents submitted to the USEPA (1995 Re-Permit Application (Attachment H-2 and Appendix A); 1984 Permit Application) indicated a maximum injection pressure for water of 2,928 psi and for brine of 2,589 psi. This information was based upon previously conducted fracture testing at the top perforation of the injection zone (4,647 psi). A pressure gradient of 1.18 psi per foot was calculated.

Upon review of the previous ten years of operation records, the average injection pressure remains between 600 to 900 psi as stated in the previous 1995 Permit Re-Application.

H.3 Source(s) of Waste (brief description of industrial process(es) which produce the waste)

The wastestream injected into the Woodward 1-26 well is non-hazardous waste brine generated by solution mining of potash (KCL) and salt (NaCl) deposits.

Sodium hydroxide is used in the stripping of H_2S from the production brine. Pump packing seal water (<10gpm), and a bleed system (<10gpm) containing some sodium bisulfite from the H_2S stripping system are also added to the disposal wastestream.

A series of four purge wells on the site intercept and pump groundwater containing chlorides (average concentration 7,456 mg/l) into the process stream that may partially reach the wastestream entering the disposal wells.



ATTACHMENT A

SUMMARY OF OPERATING, MONITORING AND REPORTING REQUIREMENTS

CHARACTERISTIC	LIMITATION	MINIMUM MONITORING FREQUENCY	MINIMUM REPORTING FREQUENCY
Injection Pressure	2526 psig maximum*	continuous	monthly
Annulus Pressure	100 psig minimum	continuous	monthly
Annulus/Tubing Differential	100 psig minimum above operating injection pressure	continuous	monthly
Flow Rate		continuous	monthly
Cumulative Volume		continuous	monthly
Annulus Fluid Loss		monthly	monthly
Chemical Composition of Injected Fluids**		quarterly	quarterly
injected Plands			<i>*</i> *
Physical Characteristics of Injected Fluids**		quarterly	quarterly
	•		

Sampling Location: The sample location will be at a manual spigot, located at the discharge point of the final filtration unit and the suction of the injection pumps.

^{*} The limitation on injection pressure will serve to prevent injection-formation fracturing. This limitation was calculated using the following formula: [{Fracture Gradient – (0.433 psi/ft × specific gravity)} × depth] - 14.7 psi. The fracture gradient of 1.17 psi/ft was determined by site specific testing of the injection zone. The Dundee Limestone at 3906 was used as the depth and a specific gravity of 1.2 was used for the injection fluid. If the permittee decides in the future to perforate the casing and inject directly into the Dundee Limestone, the permittee will be required to conduct approved in-situ stress tests, in which case the maximum injection pressure will be modified to reflect the specific value of the fracture gradient in this well. Such modification shall be considered a minor modification as allowed for at 40 CFR \$144.41(f). The permittee is also required to submit the test procedures to the Director for approval prior to conducting the tests.

^{**} As specified in the Sampling and Analysis Plan, found in the administrative record for this permit. At a minimum, this analysis shall include, but not be limited to, the following: Temperature, Specific Conductance, pH and Specific Gravity.



ORIGINAL

PERMIT RE-APPLICATION CLASS I NON-HAZARDOUS INJECTION WELL

THOMAS 1-26 (MI-133-1I-0002)

MOSAIC POTASH HERSEY, LLC HERSEY, MICHIGAN

formerly Kalium Chemicals, Ltd. IMC Kalium, Ltd. PPG Industries, Inc.

SUBSURFACE PROJECT NO. 60Z5849

REPORT SUBMITTED AUGUST 2006

PREPARED BY

SUBSURFACE TECHNOLOGY, INC. SOUTH BEND, INDIANA

H. OPERATING DATA

H.1 Average and Maximum Injection Rate and Volume

Disposal flow rates vary from a minimum of 90 gallons per minute (129,000 gallons per day) to a maximum of 600 gallons per minute (864,000 gallons per day). The average disposal flow rate for the Thomas Well is 350 gallons per minute (504,000 gallons per day). At any given time, disposal may occur to a single well or to both wells simultaneously.

H.2 Average and Maximum Injection Pressures

The maximum injection pressure has been set by permit at 2,533 psig for the Thomas 1-26 well.

Injection fluid may be water (specific gravity of 1.0) or a partially saturated sodium chloride/potassium chloride brine solution with a specific gravity as high as 1.2.

Previous documents submitted to the USEPA (1995 Re-Permit Application (Attachment H-2 and Appendix A); 1984 Fenix & Scisson Permit Application) indicated a maximum injection pressure for water of 2,928 psi and for brine of 2,589 psi. This information was based upon previously conducted fracture testing at the top perforation of the Reed City Dolomite injection interval (4,647 psi). A pressure gradient of 1.18 psi per foot was calculated.

Upon review of the previous ten years of operation records, the average injection pressure remains between 600 to 900 psi as stated in the previous 1995 Permit Re-Application.

H.3 Source(s) of Waste (brief description of industrial process(es) which produce the waste)

The wastestream injected into the Thomas 1-26 well is non-hazardous waste brine generated by solution mining of potash (KCl) and salt (NaCl) deposits.

Sodium hydroxide is used in the stripping of $\rm H_2S$ from the production brine. Pump packing seal water (<10gpm) and a bleed system (<10gpm) containing some sodium bisulfite from the $\rm H_2S$ stripping system are also added to the disposal wastestream. Boiler blowdown of typically less than 10 gpm, floor washdown of less than 10 gpm, and YPS (>1% by wt.) used as an anticaking coating for salt all become part of the disposal waste stream.

A series of four purge wells on the site intercept and pump groundwater containing chlorides (average concentration 7,456 mg/l) into the process stream that may partially reach the wastestream entering the disposal wells.



ATTACHMENT A

SUMMARY OF OPERATING, MONITORING AND REPORTING REQUIREMENTS

CHARACTERISTIC	LIMITATION	MINIMUM MONITORING FREQUENCY	MINIMUM REPORTING FREQUENCY
Injection Pressure	2483 psig maximum*	continuous	monthly
Annulus Pressure	100 psig minimum	continuous	monthly
Annulus/Tubing Differential	100 psig minimum above operating injection pressure	continuous	monthly
Flow Rate	•	continuous ·	monthly
Cumulative Volume		continuous	monthly
Annulus Fluid Loss	,	monthly	monthly
Chemical Composition of Injected Fluids**		quarterly	quarterly نر
Physical Characteristics of Injected Fluids**		quarterly	-quarterly

Sampling Location: The sample location will be at a manual spigot, located at the discharge point of the final filtration unit and the suction of the injection pumps.

^{*} The limitation on injection pressure will serve to prevent injection-formation fracturing. This limitation was calculated using the following formula: [{Fracture Gradient – (0.433 psi/ft × specific gravity)} × depth] - 14.7 psi. The fracture gradient of 1.17 psi/ft was determined by site specific testing of the injection zone. The Dundee Limestone at 3840 was used as the depth and a specific gravity of 1.2 was used for the injection fluid. If the permittee decides in the future to perforate the casing and inject directly into the Dundee Limestone, the permittee will be required to conduct approved in-situ stress tests, in which case the maximum injection pressure will be modified to reflect the specific value of the fracture gradient in this well. Such modification shall be considered a minor modification as allowed for at 40 CFR §144.41(f). The permittee is also required to submit the test procedures to the Director for approval prior to conducting the tests.

^{**} As specified in the Sampling and Analysis Plan, found in the administrative record for this permit. At a minimum, this analysis shall include, but not be limited to, the following: Temperature, Specific Conductance, pH and Specific Gravity.

22	23	24	19
27	ØMI-133-1I-0002 26 MI-133-1I-0001	25	30
34	35	36	
Scaled Map in Rel	y Michigan lation to Injection Data May 2015 Request	1	6

AMENDED ATTACHEMENT H.2. FIGURE H.2 Map showing Existing Class I NON-HAZARDOUS Injection Wells containing injection falloff and in-situ stress data, the Thomas 1-26 (NW4NW4 Section 26) and the Woodward 1-26 (NE4SW4 Section 26).

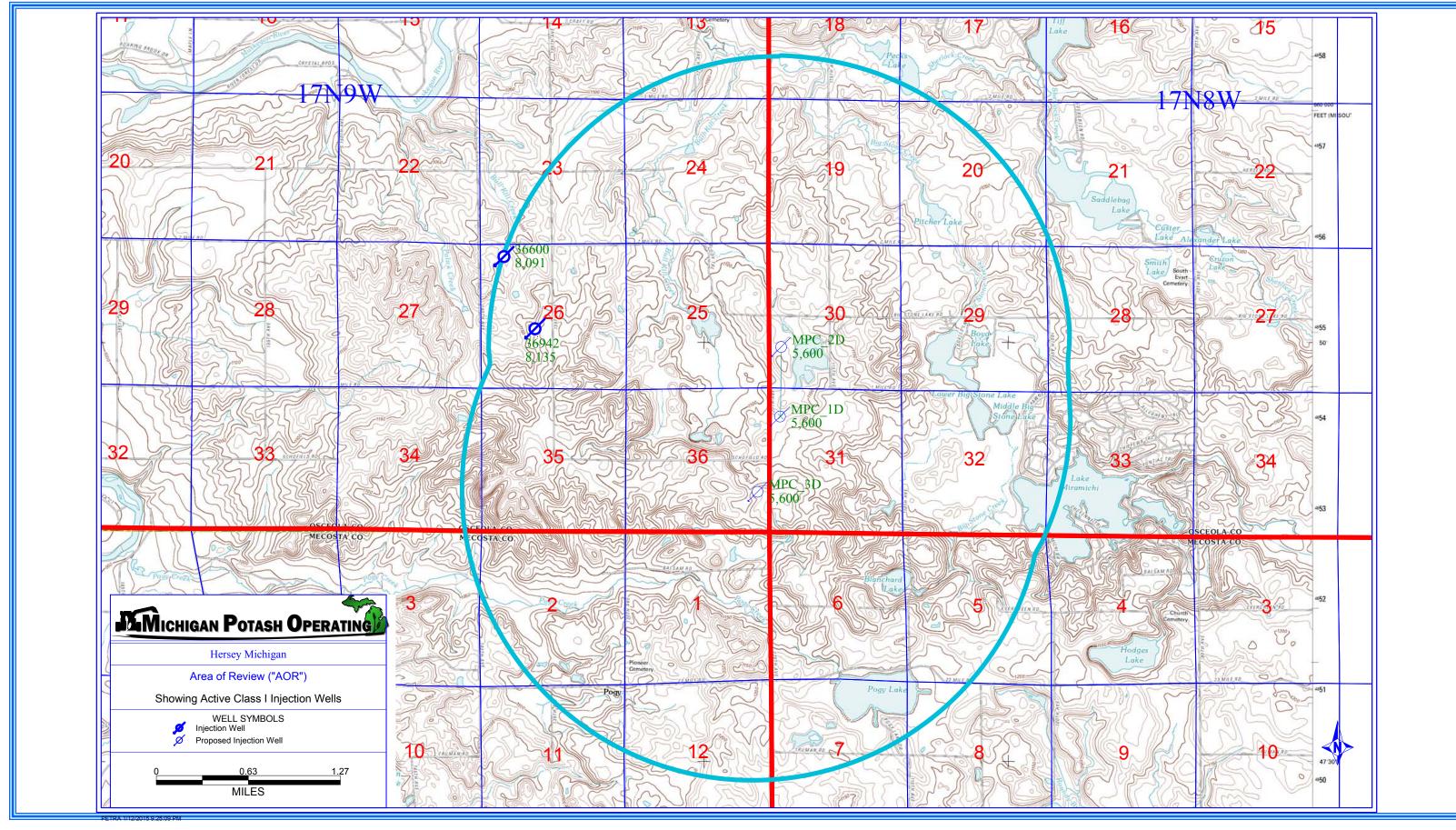


Figure B2. Map showing Existing Class I NON-HAZARDOUS Injection Wells, the Thomas 1-26 (NW4NW4 Section 26) and the Woodward 1-26 (NE4SW4 Section 26).



EPA request for Additional Information (May 2015):

5.0 Attachment H.2 of the permit application identifies a calculated friction loss within the well of 38 psi. For EPA to consider this friction loss when calculating the maximum injection pressure within the three proposed injection wells, Michigan Potash must submit the well friction analysis that established the 38 psi pressure loss.

5.1 Submit the well friction analysis that established the 38 psi pressure loss.

The 38 psi pressure loss calculation referenced by Michigan Potash, is based on step down tests as performed by IMC Kalium in 1995 and reported by they and the their successors in interest (See Section 4.0: 1995 RE-APPLCIATION for underground permit No. MI-133-1I-0002 (The Thomas 1-26), APPENDIX A).

A 38 psi pressure loss consideration is not requested by Michigan Potash at this time.





EPA request for Additional Information (May 2015):

6.0 Attachment O of the permit application, "Plans For Well Failures", must include a statement that EPA will be contacted immediately upon the determination that mechanical integrity has been lost in any of the three proposed injection wells.

6.1 Amend Attachment O.

Please see the attached and amended Attachment O, including a statement that the EPA Region V, UIC branch will be immediately contacted upon the determination that there may a loss of mechanical integrity.





US EPA UIC PERMIT APPLICATION FORM 7520-6 NON HAZARDOUS

CLASS I

ATTACHMENT O: PLANS FOR WELL FAILURES ATTACHEMENT AMENDED MAY 22ND, 2015

IN RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION MAY 11TH, 2015

THE UNITED STATES POTASH PROJECT JANUARY 2015



ATTACHEMENT O. CONTINGENCY PLAN FOR WELL FAILURES.

EPA instruction, form 7520-6 (2011):

Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW. The applicant should submit contingency plans for 1) actions that will be taken if mechanical integrity of well is lost; and 2) storage or alternate treatment or disposal of waste in the case of emergency shut-in.

O.1 Contingency Plan

Item 1: Actions to be taken in the event of loss of mechanical integrity:

Brine is transmitted through the wells in tubing suspended from the wellhead and extending to a point near the top of the receiving formation. At or near the bottom of the tubing, the annulus between the tubing and the cemented casing is sealed with a packer; thus, the entire annulus from the wellhead to the packer is sealed off from the injected brine. The annulus is filled with an inhibited brine to a point slightly below the freeze line where the remainder of space is filled with oil. The annulus pressure is maintained to hold 20 psi at all times at surface and is monitored with a continuously recording pressure gauge.

If mechanical integrity was compromised the annulus fluid pressure would change and any change would be immediately detected by a change in the annulus pressure. If the injection tubing or packer developed a leak, a change in the annulus pressure would develop and would also be immediately detected by the continuously recording pressure gauge. In either case, investigative and remedial action would be promptly taken to replace or repair the part damaged following the procedures listed in Section C-1.

Following any indication that there may be a loss of mechanical integrity, injection will immediately cease and the EPA Region V, UIC Branch will be immedialtey notified, but within in a time not to exceed 24 hours of the indication of suspected loss of mechanical integrity. The Michigan Department of Environmental Quality will be also be notified within the same period of suspected loss of mechanical integrity.

The report will be ready to relay the following information:

- Name, location, organization and telephone number of the person submitting the report;
- Exact address or location and phone number of the responsible facility;
- Location of the well:
- The date and time of the first indication of loss of mechanical integrity;
- Any damages caused by the loss;
- Danger or threat posed by the loss;
- Actions being used to stop, remove, and mitigate the effects of the loss of mechanical integrity;
- The names of individuals and/or organizations that have also been contacted; and
- Any other information that may facilitate the correct action needed to remediate the loss of mechanical integrity; and
- Additional preventive measures taken or contemplated to minimize the possibility of recurrence; and





 Such other information as the EPA Regional Administrator may reasonably require pertinent to the identification of loss of mechanical intregrity and future preventative needs.

Item 2: Plan for alternate disposal in the case of emergency shut-in:

The multiple well application allows for an excess of disposal capacity and optionally to allow for system upsets, emergency shut-in, and contingent disposal capacity.

If failure were to occur to one well, that well would be shut-in immediately, and the entire disposal flow would be directed to the other well(s). If necessary , flow rates would be reduced as needed to remain below permitted injection pressure limits.





EPA request for Additional Information (May 2015):

- 7.0 Attachment C of the application, "Corrective Action Plan and Well Data" identifies wells within the 2 mile area of review that penetrate the proposed injection formations. Construction and plugging documentation was not provided for the following wells:
 - a. Jensen 1-2, Permit # 37188
 - b. Pilarski 1-12, Permit #00340
 - c. Johnson 1-6, Permit #36067
 - d. Johnson 2-1, Permit #00377
 - e. Johnson 3-1, Permit #00337

Please submit the well construction and plugging documentation for these wells.

7.1 Submit the well construction and plugging documentation.

Find attached, a well review index, along with well files for the referenced wells, in the order listed above.



PLUGGING AND WELL HISTORY REVIEW INDEX

APPENDIX TAB LETTER	Review Check	TRS	API Number	Permit Number	Well Name and Number	Total Depth	Formation at Total Depth	Drill Date	Well Status	Well Type	WH_Lat	WH_Long	Operator Name
Z		17N-9W-36	21-133-3611-00-000	36110	THOMPSON 3-36	8366	CINCINNATIAN	Oct-82	INACTIVE	NATURAL GAS WELL	43.8203	-85.3311	Marathon Oil Co.
A		17N-9W-36	21-133-36068-00-00	36068	BABCOCK ET AL 1-36	8200	CABOT HEAD	Sep-83	INACTIVE	NATURAL GAS WELL	43.8265	-85.3272	Marathon Oil Co.
В		17N-9W-36	21-133-36925-00-00	36925	BALDINO 1-36	8200	CABOT HEAD	Sep-83	INACTIVE	NATURAL GAS WELL	43.8203	-85.341	Marathon Oil Company
Н		17N-9W-36	21-133-36991-00-00	36991	HODGES ET AL 1-36	8198	CLINTON	Oct-83	INACTIVE	DRY HOLE	43.8152	-85.3294	Marathon Oil Co.
doesn't penetrate		17N-9W-36	21-133-26888-00-00	26888	GREIN, DONALD 1	1649	BROWN LIMESTONE	Aug-67	INACTIVE	DRY HOLE	43.8225		Consumers Energy Company
doesn't penetrate		17N-9W-36	21-133-31089-00-00	31089	THOMPSON, DON; HODGES, FRANK; SMIT	1616	MICHIGAN STRAY	Jul-76	INACTIVE	NATURAL GAS WELL	43.8186	-85.3301	Mutch Harry L
doesn't penetrate		17N-9W-36	21-133-30537-00-00	30537	THOMPSON, DON; HODGES, FRANK; SMIT	1602	MARSHALL	Nov-75	INACTIVE	NATURAL GAS WELL	43.8183	-85.3299	Mutch Harry L
doesn't penetrate		17N-9W-36	21-133-2871-00-000	28710	THOMPSON & RANDOLPH 1	1586	MICHIGAN STRAY	Dec-71	INACTIVE	NATURAL GAS WELL	43.8182	-85.3394	Mutch Harry L
doesn't penetrate		17N-9W-36	21-133-28710-01-00	28710	THOMPSON & RANDOLPH 1	1586	MICHIGAN STRAY	Dec-71	INACTIVE	NATURAL GAS WELL	43.8182	-85.3394	Mutch Harry L
doesn't penetrate		17N-9W-36	21-133-28498-01-00	28498	GREIN, DONALD 1	1539	MICHIGAN STRAY	Aug-71	INACTIVE	NATURAL GAS WELL	43.8252	-85.3392	Hersey Oil and Gas Co.
doesn't penetrate		17N-9W-36	21-133-28498-00-00	28498	GREIN, DONALD 1	1526	MICHIGAN STRAY	Aug-71	INACTIVE	NATURAL GAS WELL	43.8252	-85.3392	Hersey Oil and Gas Co.
doesn't penetrate		17N-9W-36	21-133-28365-00-00	28365	THOMPSON, EDITH 1	1518	MICHIGAN STRAY	Jun-71	INACTIVE	NATURAL GAS WELL	43.8253	-85.3295	Mutch Harry L
doesn't penetrate		17N-9W-35	21-133-36627-00-00	36627	STATE HERSEY 1-35			Apr-83	INACTIVE	LOCATION	43.8167	-85.3509	Rovsek Aldolph E and Muskegon Development Company
Х		17N-9W-35	21-133-36355-00-00	36355	STATE HERSEY 2-35	8310	CINCINNATIAN	Jan-83	INACTIVE	DRY HOLE	43.8203	-85.3604	Marathon Oil Co.
F		17N-9W-35	21-133-38748-00-00		GREIN 1-35	8206	CABOT HEAD	Jun-85	INACTIVE	NATURAL GAS WELL	43.8238		Marathon Oil
doesn't penetrate		17N-9W-35	21-133-28888-00-00	28888	RANDOLPH & PAINE & THIEL UNIT 1	1655	MICHIGAN STRAY	Jul-72	INACTIVE	DRY HOLE	43.825	-85.3592	Mutch J O
doesn't penetrate		17N-9W-35	21-133-28786-00-00	28786	GREIN, DONALD & PAINE, HENRY 1	1638	MICHIGAN STRAY	Mar-72	INACTIVE	NATURAL GAS WELL	43.8251	-85.349	Hersey Oil and Gas Co.
R		17N-9W-26	21-133-37519-00-00	37519	MILLER 1-25	8425	CABOT HEAD	Aug-84	INACTIVE	NATURAL GAS WELL	43.8334	-85.3463	Marathon Oil Co.
DD		17N-9W-26	21-133-36942-00-00	36942	WOODWARD ET AL 1-26	8135	CABOT HEAD	Oct-83	INACTIVE	DRY HOLE	43.8346	-85.3568	PPG Oil and Gas Company, Inc.
K		17N-9W-26*	21-133-00378-70-00	378	KALIUM 1042*	8116	A-1 SALT	Feb-85	INACTIVE	PART 625, CLASS III	43.8401	-85.3619	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
Y		17N-9W-26*	21-133-366-00-0000	36600	THOMAS 1-26*	8085	CABOT HEAD	Jan-84	INACTIVE	DRY HOLE	43.8418	-85.3611	PPG Oil and Gas Company, Inc.
L		17N-9W-26*	21-133-00379-70-00	379	KALIUM 1052*	8045	A-1 SALT	Mar-85	INACTIVE	PART 625, CLASS III	43.8398	-85.3619	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
I		17N-9W-26*	21-133-00394-70-00	394	KALIUM HERSEY 1031*	7973	A-1 SALT	Oct-94	INACTIVE	PART 625, CLASS III	43.8394	-85.3618	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
records unavailable		17N-9W-26*	21-133-00448-70-00	448	KALIUM HERSEY 2041*	7941	A-1 SALT	Jun-00	INACTIVE	PART 625, CLASS III	43.8332	-85.3591	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
records unavailable		17N-9W-26*	21-133-00348-70-00	348	KALIUM 1011*	7827	A-1 EVAPORITE	Nov-84	INACTIVE	PART 625, CLASS III	43.8405	-85.3615	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
records unavailable		17N-9W-26*	21-133-00437-70-00	437	KALIUM HERSEY 2081*	7811	A-1 SALT	7-Jun	INACTIVE	PART 625, CLASS III	43.8327	-85.3592	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
J		17N-9W-26*	21-133-00381-70-00	381	KALIUM 1031*	4800	A-1 SALT	Feb-92	INACTIVE	PART 625, CLASS III	43.8396	-85.3619	Mosaic USA LLC, DBA Mosaic Potash Hersey, LLC
doesn't penetrate		17N-9W-26	21-133-28635-00-00	28635	PAINE, HENRY 1	1558	MICHIGAN STRAY	Nov-71	INACTIVE	NATURAL GAS WELL	43.8324	-85.3494	Mutch Harry L
doesn't penetrate		17N-9W-25	21-133-30341-00-00	30341	MILLER, DOUGLAS & THIEL, HAULDAH	1561	BROWN LIMESTONE	Aug-75	INACTIVE	DRY HOLE	43.8319	-85.3392	Mutch Harry L
doesn't penetrate		17N-9W-25	21-133-30384-00-00	30384	JOHNSON, WALT & MILLER, DOUG & THIE	1529	MICHIGAN STRAY	Aug-75	INACTIVE	DRY HOLE	43.8326	-85.3286	Mutch J O
doesn't penetrate		17N-9W-25	21-133-12066-00-00	12066	JOHNSON-CODY ET AL COMM. 1	1520	MARSHALL	Jan-46	INACTIVE	DRY HOLE	43.8392	-85.3297	Oryx Energy Co. and Carter Oil Co.
doesn't penetrate		17N-8W-32	21-133-27307-00-00	27307	MANEY, NORMAN 1	1660	MARSHALL	Jul-68	INACTIVE	DRY HOLE	43.8223	-85.3049	Consumer Power and Michigan Consolidated Gas
Е		17N-8W-31	21-133-34558-00-00	34558	FREUDENBURG 1-31	10858	PRAIRIE DU CHIEN	Jul-81	INACTIVE	DRY HOLE	43.8265	-85.3083	JEM Petroleum Corp.
F		17N-8W-31	21-133-358-00-0000	35800	GRAY 1-31	9769	PRAIRIE DU CHIEN	Aug-82	INACTIVE	NATURAL GAS WELL	43.8275	-85.3224	Marathon Oil Co.
U		17N-8W-31	21-133-36336-00-00	36336	PARK 1-31	8216	CLINTON	Feb-84	INACTIVE	DRY HOLE	43.8203	-85.322	Marathon Oil Co.
E		17N-8W-31	21-133-34558-01-00	34852	FREUDENBURG 1-31A	8183	DUNDEE	Aug-81	INACTIVE	DRY HOLE	43.8265	-85.3083	JEM Petroleum Corp.
doesn't penetrate		17N-8W-31	21-133-31786-00-00	31786	KNAPP, GERALD & PARKS, ROBERT 1-3	1590	MICHIGAN STRAY	Sep-77	INACTIVE	NATURAL GAS WELL	43.818	-85.32	Hersey Oil and Gas Co.
CC		17N-8W-30	21-133-35977-00-00	35977	WARK 1-30	8371	CINCINNATIAN	Sep-82		DRY HOLE	43.8421	-85.3128	Willmet Inc.
P		17N-8W-30	21-133-33466-00-00	33466	MANEY, NORMAN 1-30	5080	AMHERSTBURG	Feb-80	INACTIVE	DRY HOLE	43.8347	-85.3196	Dart Oil and Gas Co.

APPENDIX TAB LETTER	Review Check	TRS	API Number	Permit Number	Well Name and Number	Total Depth	Formation at Total Depth	Drill Date	Well Status	Well Type	WH_Lat	WH_Long	Operator Name
О		17N-8W-30	21-133-27159-00-00	27159	MADDERN, H 1	4030	DUNDEE	Feb-68	INACTIVE	DRY HOLE	43.8333	-85.3126	Madlou Inc.
AA		17N-8W-19	21-133-38463-00-00	38463	VUKIN UNIT 1-19	8385	CINCINNATIAN	Feb-85	INACTIVE	DRY HOLE	43.844	-85.3148	PPG Oil and Gas Company, Inc. and Amoco Production Co.
AA		17N-8W-19	21-133-38463-70-00	5006	VUKIN UNIT 1-19	8385		Dec-84	INACTIVE	DRY HOLE	43.844	-85.3148	PPG Oil and Gas Company, Inc. and Amoco Production Co.
Submitted May 22nd 2015		16N-9W-2*	21-107-37188-00-00	37188	JENSEN 1-2*	8085	CABOT HEAD	Nov-83	INACTIVE	DRY HOLE	43.8073	-85.3455	Marathon Oil Co.
16N-9W-12		16N-9W-12	21-107-00340-70-00	340	PILARSKI 1-12	8318	CINCINNATIAN	Aug-84	INACTIVE	DRY HOLE	43.7974	-85.3266	PPG Industries, Inc.
Т		16N-9W-12*	21-107-36283-00-00	36283	PARK 1-12*	8215	CINCINNATIAN	Jan-83	INACTIVE	DRY HOLE	43.798	-85.3409	Willmet Inc.
ВВ		16N-9W-11	21-107-00339-70-00	339	WARD 1-11*	8121	CINCINNATIAN	Aug-84	INACTIVE	DRY HOLE	43.7901	-85.3466	PPG Industries, Inc.
Submitted May 22nd 2015		16N-9W-1	21-107-00377-70-00	377	JOHNSON 2-1	8085	A-1 SALT	Apr-84	INACTIVE	DRY HOLE	43.8098	-85.3291	PPG Industries, Inc.
Submitted May 22nd 2015		16N-9W-1	21-107-00337-70-00	337	JOHNSON 3-1	8073	A-1 EVAPORITE	May-84	INACTIVE	DRY HOLE	43.8098	-85.329	PPG Industries, Inc.
W		16N-8W-7	21-107-36187-00-00	36187	STEIN 1-7	8380	CINCINNATIAN	Nov-82	INACTIVE	DRY HOLE	43.7911	-85.312	Willmet Inc.
Submitted May 22nd 2015		16N-8W-6	21-107-36067-00-00	36067	JOHNSON ET AL 1-6	8386	CINCINNATIAN	Oct-82	INACTIVE	DRY HOLE	43.8057	-85.322	Marathon Oil Co.
doesn't penetrate		16N-8W-6	21-107-30728-00-00	30728	MCLACHLAN, GEORGE 1-6	1670	MICHIGAN STRAY	May-76	INACTIVE	DRY HOLE	43.8033	-85.3101	Mutch Harry L
doesn't penetrate		16N-8W-6	21-107-30654-00-00	30654	KNAPP, GERALD & JOHNSON, DON 1-6	1610	MICHIGAN STRAY	Dec-75	INACTIVE	NATURAL GAS WELL	43.8109	-85.3198	Mutch Harry L
V		16N-8W-18*	21-107-3689-00-000	36890	STEIN 1-18*	8264	CINCINNATIAN	Aug-83		DRY HOLE	43.7765	-85.3074	PPG Oil and Gas Company, Inc.

a. Jensen 1-2, Permit # 37188



T54

	GE	OFACIONE SAULES	DITION			ENDED 1-27	-88	
	WE	LL PLUGGING	RECORD		PERMI	TNUMBER		
(Su	bmit in TRIPLIC	ATE Within 30 Days A	fter Plugging is Con	npleted)	37	188		
						NAMÉ	——————————————————————————————————————	
					He	rsey		
COMPLETE NAME	E(S) AND ADDRI	ESS OF WELL OWNE	R		<u> </u>			_
	& Gas Co.		•					
COMPLETE LEAS							WELL NUMBER	
(Jensen)	C OH FARM NAI	AIE (D)				4	₹	
\					·		1-2)	
WELL LOCATION	SE 1/2	NTO VACA A	T 165		TOWNS	1	COUNTY	
		NE % SEC. 2	T. 16N		Gra		Mecosta	
TYPE OF WELL	Dil. Gas, Dry Hole	, etc.)		TOTAL DEPTH	FORMA	ATION		
Dry Hole				8085) C	abot Head		
DATE PLUGGING	STARTED	DATE PLUGGING	COMPLETED	DEPT. REPRESENTA	TIVE(S)	NHO ISSUED PERMI	T OR WITNESSED	
11-30-83		11-30-	83	PLUGGING Ben	Gunn	ing		
	04011	0.05000		1		001000000000000000000000000000000000000		
		G RECORD				BRIDGES OR PLUGS		
SIZE CASING	DEPTH Set	AMOUNT RECOVERED	SHOT OR RIPPED	TYPE (Brush, S Cement, Mechanic		DEPTH PLACED	SACKS OF CEME	
24"			nii co	Carrett, Macriatic	u, u.c.,	72,000		
	132	None		Cement	<u> </u>	8085-5885	450 Sx	
13 3/8"	848	None		Cement		5885-5300	290 Sx	
9 5/8"	5408	None						
				,			······································	
							,	
				/ L	*****			
Were tools, tubir	o cacing etc. i	ost or left		lf γes, give	dotaile			
				• • =	uetans.			
in the hole befor	e or auring plug	ging/	☐YES 🖾	NV			- VA	—
								_
Did a Service Co						nd address: 🔌		
spot cement, or s	set bridge plugs	?	₹ XYES □	NO <u>Halli</u>	.burt	on Y		
						on P	<u> </u>	÷
Was the well plug	gged by a Comp	any or		lf yes, give	name a	nd address:	` ¢ '	8
Contractor other	than Owner or	Operator?	☐ YES 🔯	NO			<u> </u>	1
							<u> </u>	
	of Owner, Opera	ator, Company, or C	Contractor who w	itnessed	Ma.	rvin Woods	<u> </u>	
pługging:							رم می	
							7/4	
DESCRIBE IN DET	AIL HOW WELL	WAS PLUGGED			***************************************			
- Ran dri	ll pipe :	in and set .	3 150 sx p	lugs from TD	to 5	885, set 29	0 sx from 5	38
to 5300	and bolt	ted temperat	ture plat	on wellhead.		porarily ab		n
8-23-84	tagged o	cement at 5	1951/ On	8-24-84, Hall	i bur	ton spotted	100 cack	-
plugs c	of Howcol	te cement :	at each de	oth of 5195',	125	01 25211	26041 and	_
1847	a 165 sac	ck Howcolite	nlug ot	1010' and a 7	433	o . 3341 .	2004 and	_
cement	at 210'.	CK HOWCOTTC	s prug at	roro and a /	<u>o sac</u>	ck blud of	Class A	
		/01 <u> </u>		1.1. 7. (0.11 2				
13 3/6	and 9 5/	casings	capped wi	th 1/2" plate	3' 1	<u>selow grade</u>	•	_
				······································			·	
	··			-,				
			· · · · · · · · · · · · · · · · · · ·		····			
			-					
						(USE REVERS	E SIDE IF NEEDED)	*****
								_
	·	······	AFAT:	EICATION				
40			CERTI	FICATION			• • • • •	

"I state that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction, and that the facts stated herein are true, correct and complete to the best of my knowledge." COMPANY NAME AND ADDRESS

Donald D. Metzger, Resident Manager SIGNATURE WOULD ROUTE

NAME AND TITLE (Typed or Printed)

DATE (Month, Day, Year)

1-23-88

Kalium Chemicals 11126 140th Ave. Hersey, MI 49639

EPARTMENT RIPRESENTATIVE

AMENDED 1-27-88

DATE

		AL WELL PLUG			1			-831-35	4	
							1-22			
THER OR OP	ERATOR	· ·····			·	11				
PP	G Oil & Ga	s Co., Inc.							···	
DRESS	o DDC Blog	e, Pittsbur	ah Dii	15272						_
LLNAME	e PPG FIAC	e, Fictsbur	gii, PA	13272		Tw	ELL NUM	BER	·	
,	nsen						1-2			
ELL LOCATE				7.5			OWNSHIP		COUNTY	
SE ½	SE ½	NE % SEC	<u>. 2 T.</u>	161			rant		Mecosta	i
Te	. (Brine, Disposal S St	storage, or Test)			8085		ORMATIO Cabot			
ATE PLUGGE	NG STARTED		ING COMPLETE	ED	WAS PERMI OBTAINED	SSION OF DE BEFORE PLU	PT. OF NA	TURAL RESC	URCES U YES	□ NO
AME OF DEP	ARTMENT REPRE	SENTATIVE WHO A	UTHORIZED O	R SUPER	VISED PLUG	GING		,	<u>.</u> ,	
					···					
CASING SIZE	WHERESET	AMOUNT RECOVERED	SHOT OR RIPPED		TYPE	OF BRIDGES	OR PLUG	5	DEPTH PLACED	NUMBER SACKS
24"	132	None		•	ent				8085-588	
13 3/8		None			ent	3 ! ! .	1 5305		5885-530	
9 5/8	5408	None		Cem		<u>wcolite</u> 1'. 268		', 4358		180 a ch dept
]	Cen	ent (Ho			<u> </u>		165
				I	ent (Cl		<u></u>		210	75
		L WAS PLUGGED	Hole was							
		bandoned. potted 180	On 8-23-8						8-24-84,	
		2684', and								
		of Class A				<u> </u>	0 12.09	00 101	0 0,110, 0	<u>-</u>
	3/8" and 9	5/8" casin	gs capped	d Wit	h 1/2"	plate 3	, pelo			
						<u> </u>		(USE F	REVERSE SID	E IF NEEDED
'ere tools, tu	bing casing, etc.	lost or left				f yes, give de	etails:			
	fore or during pla			ES [XXNO _					
		······································			· .	(EOLOG	NA A T	The Marie of the San	
								- 10 10	RIVE V	
	Company pump or set bridge plug		⊠ Y!	FS [fyes, give na Hallibu:		oaress: Mt.5 Polær	asant	
	Or set bridge prog	jə:		LO [$C(N_{i})$		<u> </u>
as the well p	olugged by a Com	pany or	,	,	1	fyes, give Pγ	emented a	ddress: CBOnding		
ontractor of	her than Owner o	or Operator?	∐ Y	ES (xkNO _			· Bonding	I.Un <u>it</u>	
epresentatives	of Owner Operato	r Company or Cont	ractor who witne	ssed plug	ging					<u> </u>
C. (Cookingham					 				
Dona	ald D. Met:	zger			IFICATE Kalium	Chemica	ls	···	(company)
		aid Owner or Oper					as prepare	d under my		
SIGNATURE	11 1 Sm 17	7	ADDRESS				TITLE			
_ Won	exo WW	dyes			Ave.,		WI.	Reside	nt Manag	[er
			F	INAL II	ISPECTION	S			DATE	
EPARTMENT	REPRESENTATI	ve *							DATE	

MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315, P.A. 1969)

SUBMIT IN TRIPLICATE

								P	MEN	DED 12	2 - 9-87			
NAME OF OWNER O	R OPERA	TOR			·		ADDRI	SS OF OWNER	OR O	PERATOR				
PPG Oil &	Gas.,	In	C.					8 Enterpi Pleasant						
NAME OF DRILLING	CONTRA	ACTOF	3				ADDRESS OF DRILLING CONTRACTOR							
James Biga	ard Dr	i11	ing Com	pany			1315 S. Mission Mt. Pleasant, MI 48858							
WELL NAME Jensen	>						WELL 1-	NUMBER 2	PERI	MIT NUME 245-8	31-354			
LOCATION SE SE	NE	w			•		SECTIO 2)N	TWP	16N	F	RANGE	 ∂W	
TOWNSHIP G1	 cant		·····				COUNT	Y Mecosta	<u>. </u>				:	
FOOTAGE 330		Ft fro	sou Sou		Lín	ie and _	330	Ft. from		Est.	Line	of qua	rter section	
DATE DRILLING CON			N 6 DATE DRIL 11-28-8		OMPLE	TED	DATE	WELL COMPLET		E	DE OF WE	LL		
FORMATION COMPL Cabot			TOTAL DE	тн 85			ELEVATI	ON KB	RB nj	₹ 7 RT	T V J S	113	098 GN	
ROTARY TOOLS	0	Feet	t _o 80	85		Feet	CABLE		1 '6	Gent to	, Q,		Fee	
		.,,			WEL	L CASI	NG RECO	ORD		nail	 % .		***************************************	
TUBING A	ND CASIN	IG DA	TA			CEMENTI	NG DATA			PERFOR	ATTONS O	R OPEN	HOLE	
SIZE LB./FT	. GRA	DE	DEPTH 132	SACK DP		TYPE	STAGII	NG DEPTH(S)	NO	HOLES	FRC	М	ТО	
13 3/8"			848	900					 -				11.4%	
9 5/8"			5408	1600			 	<u></u>						
	<u> </u>		<u></u>	<u> </u>			L		<u> </u>			1		
	VATER Z	1					V	WIRE LIN					I COPY TO	
FORMATION (Fresh)	FROM	ТО	AMOL			vice con Lumber		TYPE LOG			- 8084		COPY TO SURVEY Yes	
(Fresh)				——	SCIL	ramber	<u>.qer</u>	DLL-CNL-C	11/		- 8084		Yes	
	1							Sonic			- 8084		Yes	
	 		-		·						·		ļ	
FRACTURE	OR ACI	D TR	EATMENT					SOLUT	ION N	MINING		- /=+		
DATE	FROM	то	QUANT	ITY	NA	ME AND	NUMBER	OF INJECTION	AND	TARGET	WELL - D	ISTANC	E APART	
				╌╬										
<u> </u>														
					· · · · · · · · · · · · · · · · · · ·									
			The inform	nation in	and att	ached to	this report	is complete and	correc	t				
SIGNATURE (CO	ull	We	Welve Metzle	<u>.</u>	7			nemicals		•	D	ATE	0-07	
	JOHATO	. D.	 _					Manager				14-5	0-07	
			GIVE	COMPLET	TE EMÉ	ΚΜΑΤΙΏΝ	RECORD	ON REVERSE	SIDE					

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION	USED:	GEOLOGIST NAME:			TOPS TAKEN FROM: SAMPLE LOG ELECTRIC LOG
FROM	то	FORMATION (TYPE, COLOR, ETC.)	FROM	то	FORMATION
FROM	TO	(TYPE, COLOR, ETC.)	FROM	ТО	(TYPE, COLOR, ETC.)
		5.4 	IF WELL WA	AS CORED. A	TTACH CORE DESCRIPTION AND ANALYSIS
				LI	ST ATTACHMENTS:
				GEOL OG	ICAL SURVEY LISE ONLY
			REVIEWED 8		ICAL SURVEY USE ONLY
			DATE OF CO	MPLETION	

FEB 3

MINERAL WELL PLUGGING RECORD

File in DUPLICATE Within 30 Days After Plugging is Completed

PERMIT NUMBER
37188
DATE

				5 0 .	-		DATE		
		N.					1/12/84		
DWITERORD							i		
	.1 & Gas Comp	any, Inc.							
ADDRESS 2258 E	Interprise Dr	ive, Mt. Plea	asant, MI 4	8858					
WELL NAME							WELL NUMBER		
Jensen	1						1-2		
MELL LOCAT	_	······································					TOWNSHIP	COUNTY	
SE 1/2	· -	NE % SEC	. 2 T .	. 16N	R.	9W	Grant	Mecosta	a
Dry Ho	L (Brine Disposal S)le	torage or Test)			•	DEPTH	FORMATION Cabot Head		
DATE PLUGGI	ING STARTED	i	SING COMPLETE	ED			F DEPT OF NATURAL REPLUGGING BEGAN?	SOURCES XX YES	DNO
		SENTATIVE WHO		R SUPER	I RVISED PL	UGGING		ALA TES	UNU
Ben Gu	ınning								
				-					
CASING	1	AMOUNT	SHOT OR					DEPTH	NUMBER
SIZE	WHERESET	RECOVERED	RIPPED		TYI	PE OF BRID	GES OR PLUGS	PLACED	SACKS
24"	132 ·	None		Cer	nent			8085-588	450
13 3/8"	848	None		Сет	nent			5885-530	290
9 5/8"	5408	None			····				
		<u> </u>					 		
					<u> </u>				
	1	<u> </u>	11	<u> </u>		·			
DET RIBE IN	DETAIL HOW WEL	L WAS PLUGGED		-					· · · ·
Ran	drill pipe	and set 3 150) sx plugs	from t	total d	lepth to	5885. Set 290 s	x from 588	5
							arilmahendoned.		
					#100 CD 16	1.00 1 2 Left	SAWAEI		
		·							
						EEB - 6	1984	-	
								·· -	·
								REVERSE SIDE	IF NEEDED
					海罗斯·哈斯斯 西斯斯·西斯		1 07770N E DEL 1 1010 e details:		
	bling casing etc.,	the state of the s	YE		⊠ NO	It yes, giv	e details:		
in the note be	fore or during plu	igging:	L., 15	:5 L	7 7Γ14Ω				
·									
Did a Service	Company pump r	nud				If yes, giv	e name and address:		
spot cement.	or set bridge plugs	37	XX YE	s [] NO	<u>Hallil</u>	ourton		
		 	<u> </u>					•	<u></u>
	plugged by a Com			-		If yes, giv	re name and address:		
Contractor of	ther than Owner o	Operator?	Ŭ YE	=2 [7	⊠ NO				
Representatives	of Owner Operator	Company or Contr	actor who witness	sed plugg	ing				
Mar	vin Woods							•	
				CERTI	FICATE		, <u>, , , , , , , , , , , , , , , , , , </u>		
	liam E. Book						gical Services, I		
tate that I ar	n authorized by sa	aid Owner or Oper	ator to make th	is repor	t; and tha	it this repor	t was prepared under my	supervision ar	d direction.
	tacts stated herein	are true, correct a		the bes	το την k	nowle ag e.	TITLE		
IGNATURE	11. 9	Bal	ADDRESS 1425 S.	Micei	ion Me	. Pleasa		f•	
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RTMENT	HI PRESENTATIV	E						DATE	

William & Book

MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315, P.A., 1969)



SUBMIT IN TRIPLICATE

1/12/84

NAME OF	OWNER C	DR OPER	ATOR					ADDRE	SS OF OWN	ER C	OR OPERA	TOR			
PPG	0il & G	as Co.	, inc	•					58 Enterp						
								Mt. Pleasant, MI 48858							
NAME OF	DRILLING	CONTR	ACTOR					ADDRESS OF DRILLING CONTRACTOR							
Jame	s Bigar	d Dril	ling	Company				1315 S. Mission							
								Mt	. Pleasa	nt,	MI 4885	58			
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SIGNATURE	<u> </u>					TITL	LE							DATE	

Geologist

STATE OF MICHIGAN



NATURAL RESOURCES COMMISSION THOMAS J. ANDERSON F. R. CAROLLO DB A. HOEFER EPHEN F. MONSMA HILARY F. SNELL PAUL H. WENDLER

HARRY H WHITELEY

JAMES J BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING BOX 30028 LANSING. MI 48909

RONALD O SKOOG Director

October 26, 1983

ijc)

Mr. Donald P. Smith PPG Oil & Gas Co., Inc. 2258 Enterprise Drive Mt. Pleasant, MI 48858

Dear Mr. Smith:

Enclosed is Mineral Well Permit #1245-831-354 to drill and abandon a mineral exploration well in the SE $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 2, T16N-R9W, Grant Twp., Mecosta County. This permit was issued under the provisions of the "Mineral Well Act", Act 315 PA 1969, as amended.

It is my understanding that this well is also being permitted under Act 61, 0il and Gas Act. This was not indicated in your covering letter. In the future please alert us to the fact that simultaneous permitting is being requested.

Records of the well drilled under this permit are due within 60 days of completion. For information on contents of these records, please refer to Rule 72(a). These records and supporting information will be held confidential as per Section 17(5) and Rule 73 of the Act.

Whenever possible, please indicate county, township and range on each record sent into our office.

Thank you for your cooperation with us on these matters.

Sincerely.

.J. Rarick, Acting Chief

Mineral Well Unit

Geological Survey Division

AJR:bb Enclosures

MINERAL WELL PERMIT

For a Test Well(s)

			mit No. 245_831_354		
		Dat	e Issued 0-26-33	Date Expire 04-26-8	
	anted to PPG Oil & Gar e Drive, Mt. Pleasant	•	(name)		
to drill and abane (type of operation) to be located in $SE^{1/2}$,	don SEW, NEW, Sec. 2, T10	[type of	al exploration test well(s) p., Mecosta Cou	inty	
				RB	RF
Jenson (well name)	1 2 (well number)	N7acayan (formation)	(intended depth)	RT	GN
HOLE TO BE PLIN	GGED FROM TOP TO BOTTO	DM WITH NEAT CEM	ENT.		
	provisions and requirements r of Mineral Wells and the D			iles, requireme	nts, or orders
SUPERVIS	SOR OF MINERAL WELLS	By: Title: Address:	A.J. Marick, Mineral Meil		. **
Please address all noti and records to:	fications, correspondence,		Geological Su Dept. of Natu Box 30028, La	rvey Divisi ral Resourc	208
		Telephon	e: 517/373-9289		

1. This permit is issued on the basis of the approved program outlined in the application. No changes or alterations are to be made without the permission and approval of the Supervisor of Mineral Wells or his authorized representative.

— NOTICE –

- 2. This permit, or a copy thereof, shall be posted at a conspicuous place at the well location or be in the possession of the driller.
- 3. It is further made a requirement of this permit that the applicant (or contractor) give notice to the public utilities in accordance with Act 53, Public Acts of 1974, Compiled Laws 460.701 to 460.718 and comply with each of the requirements of the act.
- 4 An unusual, unexpected, or difficultly controllable large volume of oil, gas, brine or flowing fresh water or a condition hazardous to public health, safety, or waters of the state shall be reported immediately to the Supervisor.

Distribution: Linen-applicant—2-Lansing—3-field—4-applicant

. continued		
c. How are salt cuttings to be he	andled? Cuttings will be dissolved, and brine	
d. Are all fluids in the lined	pit to be removed and disposed of in approved	method?
folded over liner and/or an	ngs to be removed <u>or</u> totally encapsulated wit additional impermeable cover as needed, for buer? xxx Yes [] No If no, explain:	rial at
f. Is approval of the encapsulation XXXXX Yes [] No If no, explain:	ion to be received from the District Geologist?	
	est procedures, all fluids must be contained in oved facilities for disposal. Comments:	n steel
Other Department personnel cor See item #16	ntacted? ¼¼Yes [] No Comments:	
Manager's or Surface Owner's obje	develop specifications in keeping with the Statectives. NGS: ANCE OF A PERMIT TO DRILL THIS SITE.	100 Land
DISTRICT GEOLOGIST'S COMMENTS:		
DISTRICT GLOCOGIST S COMMENTS.	- 71	
GEOLOGICAL SURVEY DIVISION:		and the final
GEOLOGICAL SURVEY DIVISION:		(date)
LAND MANAGER'S COMMENTS:	(signature)	(uate)
LAND MANAGER (If State Surface):	*	
	(signature)	(date)
, REGIONAL DIRECTOR'S COMMENTS:		
REGIONAL DIRECTOR:	BY:	(do 5-5)
	(signature)	(date)

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries, Inc.

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



October 19, 1983

Mr. Wayne T. Todd Regional Mineral Wells Geologist Michigan Department of Natural Resources Clare Avenue Clare, MI 48617

Mr. Ty Black Assistant to the Regional Geologist Michigan Department of Natural Resources P.O. Box 128 Roscommon, MI 48653

Gentlemen:

Attached is a copy of an application for a permit to drill a Mineral Test Well in Grant Township, Mecosta County. This application was submitted in Lansing on October 19, 1983. I would appreciate your early handling of the field review in order to expedite the issuance of the permit.

Please note that the Mineral Well Act provides confidential treatment of information related to the permit and all data obtained from the well.

Please call me at (517) 773-3949 if we can be of assistance.

Sincerely,

Donald D. Metzger

Director, Exploration & Michigan Operations

Donald D. Metzguji

DDM/blb Attachments

STATE OF MICHIGAN	•	1 DATE OF APPLICATION	2 FEE ENCL	FEE ENCLOSED				
DEPARTMENT OF NATURAL RESOURCE	10-18-83	\$1.00	\$1.00					
GEOLOGICAL SURVEY DIVISION		3 APPLICATION TO						
		Drill						
APPLICATION FOR A MINERAL WELL	4. TYPE MINERAL WELL 5. WELL DESIGNATION							
To Drill, Operate, Convert, or Rework		D-5 (Test Well)		Jensen	1-2			
a Brine, Storage, Disposal, or Test Wel		6 LOCATION:		Benben			·	
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		SE/4 of the SE/4	Or the NE	8 COUNTY			JW	
By Authority of Act 315, P. A. 1969				-	_			
		Grant		Mecosta	1	1		
9 APPLICANT							EPHONE	
PPG 0il & Gas Co., Inc.					(<u>' </u>	773-394 <u>9</u>	
11. ADDRESS (Street City, State)				12 ZIP CODE				
2258 Enterprise Drive, Mt. Pleas	ant, MI					488		
13 SURETY OR SECURITY COMPANY		14. TYPE	DI ANKET	15 AMOUNT		16 BON		
Hartford Accident & Indemnity Co	•	SINGLE	BLANKET	\$25,000.0	00	4506	230	
17 OWNER OR SURFACE RIGHTS	_	18 OWNER OR MINERAL F	RIGHTS					
Philip C. Jensen		Philip C. Jensen						
19 DRILLING CONTRACTOR	20 ADDRESS					21 TEL	EPHONE	
T. D. Provins	P.O. Box 6	642, Mt. Pleasant,	MI 4885	58 ⁻	(517)7	73-6946	
22 TYPE DRILLING TOOLS	23 FORMATIO	ON		\ <u> </u>		24 INT		
CABLE X ROTARY COMBINATION	Niagaran				8,000'			
25 PROJECT ENGINEER OR GEOLOGIST	26 ADDRESS						EPHONE	
	2258 Enter	rprise Drive, Mt. P	loggant	мт дааг	50 /	Ţ	73-3949	
D. D. Metzger 28 PROGRAM OF DRILLING CONVERTING REWORKS						DII) I	13-3949	
(See appropriate instruction sheet Attach 3 copies of pr	oposed program -	- including but not necessarily I	imited to info	rmation reques	ted in 1	the		
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			Stora	age D-2			R-1	
Exhibits 1, 2, 3 enclosed		•	Dispo Solut	posal D-3			R-1	
AANIDIES I, 2, 7 enclosed	GC	OCT 2 () 1983			D-4		R-2	
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		LS OR HIS AUTHORIZED RE						
29 ADDRESS CORRESPONDENCE AND PERMIT TO:						30. TEL.	EPHONE	
PPG Oil & Gas Co., Inc., 2258 Ent	erprise Dri	ive, Mt. Pleasant,	MI 4885	8		(517)	773-3949	
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MINERAL WELL SECTION USE ONLY	T	The Applicant agrees						
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. A A		application and attach	ed report is	true and cor	rect.			
APPLICATION APPROVED BY								
APPLICATION APPROVED BY		OLONIA TURE (ARRIVA			- 1	DATE		
arceur		SIGNATURE (APPLICANT/	AUTHORIZE	D KFL)		DATE		
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1245-831-354		25mile 10-18-83						
DATE ISSUED		NAME (TYPED)						
10-26-83		Donald P. Smith						
ISSUED BY		TITLE						
cere hh		Exploration Engin	eer				į	
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White — Lansing Canary — Field								
Pink & Applicants 7019 10								

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries Inc

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



October 19, 1983

Mr. Al Rarick Department of Natural Resources Geological Survey Division P. O. Box 30028 Lansing, MI 48909

Dear Mr. Rarick:

Re: PPG Oil & Gas Co., Inc. Standard Casing and Cementing Procedures

Listed below are PPG Oil & Gas Co., Inc. standard casing and cementing procedures:

- 1. Drive 24 pipe as deep as possible. This allows us to set 20" conductor inside and lower if trouble occurs with washout under conductor pipe while drilling surface hole.
- 2. Drill 17 1/2" hole to base of drift or to a firm footing as determined by geologist from samples.
- 3. Run 13 3/8" S.T.C. 48# Seamless H-40 casing equipped with Texas pattern weld on shoe. A float collar is set 30', or one joint, off bottom. The lower 5 joints of casing are strapped across collar in either two or three sectors. Top and bottom cement plugs with no centralizer as recommended by cementing company (see attached).
- 4. We also run a cement basket approximately 50' below surface, making sure cement is circulated back to surface.
- 5. We then drill 12 1/4" hole into Bass Islands formation or the Amherstburg if local drilling shows no lost circulation zones in the Bois Blanc and set 9 5/8" L.T.C. 40# N-80 grade pipe with a guide shoe on bottom with float collar first joint up and all bottom 6 joints secured with Weld-A or Baker Lok or some similar material.
- 6. Centralizers are run per cementer's recommendation attached.
- 7. For both the surface and intermediate casings, the lower joints of casing are roughened unless they appear rusty as this provides a much better bond for cement.

Sincerely

Donald P. Smith Exploration Engineer

DPS/blb Attachment

Exhibit #1

Surface Casing (13 3/8" in 17 1/2" hole @ 750')

- A. Use insert float and Texas Pattern Shoe and lock to shoe joint with thread lock.
- B. No centralizers
- C. Circulate hole a minimum of one complete circulation
- D. Do not reciprocate casing
- E. Run bottom (red) wiper plug. Do not use if carrying LCM in cement.
- F. Pump 70 bbls. fresh water ahead of cement
- G. Cement with:
 - 475 sx 50/50 Poz., 6% total gel, 3% CaCl₂
 1.54ft³/sk, 13.3#/gal, 7.66 gals/sk
 - 2. 200 sx Class "A", 3% CaCl₂ 1.18 ft³/sk, 15.6#/gal, 7.66 gals/sk

Intermediate Casing (9 5/8" in 12 1/4" hole @ 5100')

Recommended Procedure:

- A. Use float collar and guide shoe and lock to shoe joint with $Halliburton\ Weld-A$
- B. Run one centralizer 10' above guide shoe and four more at every other collar spacing.
- C. Circulate hole a minimum of one complete circulation and until the drag stabilizes.
- D. Reciprocate casing while circulating and cementing. Stop reciprocation just prior to bumping top plug.
- E. Run bottom (red) wiper plug. Do not use if carrying LCM in cement.
- F. Pump 30 bbls. fresh water ahead of cement.
- G. Cement with enough cement from caliper log to bring cement to surface on all intermediate casing strings.
- H. Run top (black) wiper plug.
- I. Displace with fresh water.

Casing Equipment: (9 5/8")

Regular guide shoe, float collar with auto fill, Halliburton weld-A (2), Centralizers (5)

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries, Inc

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



October 19, 1983

Mr. Al Rarick Department of Natural Resources Geological Survey Division 4th Floor, Mason Building P. O. Box 30028 Lansing, MI 48909

Dear Mr. Rarick:

Subject: PPG Oil & Gas Co., Inc. Testing Program

The test well covered by this application is being drilled into the top of the Niagaran formation to approximately 8,000'. The primary objective is evaluation of the potash mineralization of the A-1 Evaporite, which occurred in the interval -7,579' to -7,931' in the Freudenburg 1-31 well located in the SE/4 NE/4 NE/4 of Section 31, T17N, R8W, Osceola County, Michigan.

The testing program will consist of cutting 4" cores through the anticipated potash mineralized section. Then gamma ray, neutron and other geophysical logs will be run at total depth.

Geophysical logs will also be run from the base of the surface casing to total depth. Sample cuttings will be retained and sample descriptions will be submitted with the plugging record. Potential disposal horizons will be drill stem tested.

Sincerely,

Donald D. Metzger

Director, Exploration & Michigan Operations

Donald D. Metygey je

DDM/blb

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries, Inc.

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



October 19, 1983

Mr. Al Rarick Department of Natural Resources Geological Survey Division 4th Floor, Mason Building P.O. Box 30028 Lansing, MI 48909

Re: Casing Removal and Plugging

Dear Mr. Rarick:

Upon completion of the coring and logging of the test well covered by attached permit application the well may be abandoned and plugged. If not abandoned, change of status will be requested at a later date.

Plugging will consist of running open end drill pipe to T.D. and setting continuous cement plugs to surface. The casing will be cut off at least 3 feet below surface and a 1/2" steel plate welded over the top of surface casing stub.

The cellar will be removed and backfilled according to D.N.R. specifications.

Sincerel

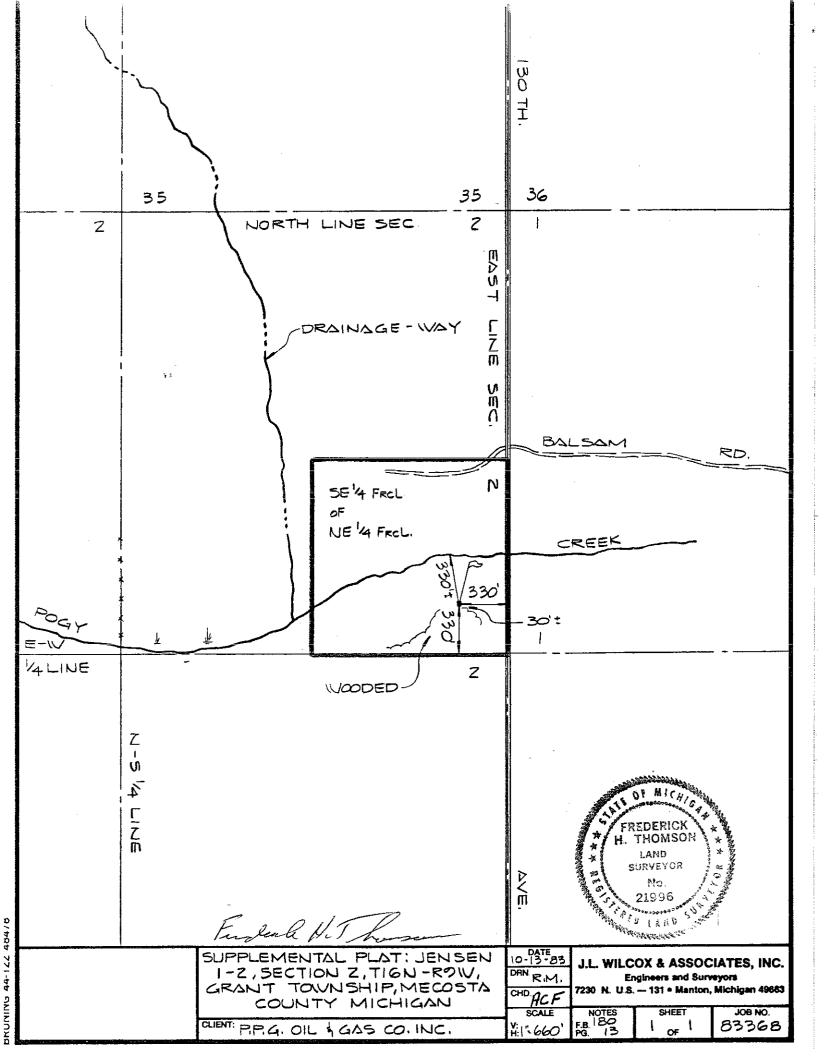
Donald P. Smith Exploration Engineer

DPS/blb

SURVEY RECORD OF WELL LOCATION

(Submit five copies with Application for Permit to Drill a Well for Oil or Gas, Brine Disposal, Hydrocarbon Storage or Secondary Recovery)

83368	1	brine Disposai,	пуагосагвої	n Storag	e or seco	ondary Re	covery)			
LESSEE (OWNE	R OF LEASE RIGHT	S)								
P.P	.G. <u>Oil & G</u> a	is Company, I	nc.							
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	<u>p Jensen</u>			<u>(Jensen</u>	<u># 1-2)</u>				1-2	
LOCATION	E % 0F	SE % c	of NE	1/4	SECTION	2	т.]	6 N	в. 9 W	I
TOWNSHIP	Grant			COUN		costa				
PLAT BELOW REPRESENTS ONE FULL SECTION (1 Mile Square)					Outline drilling unit and spot well location on plat at left. Where drilling unit crosses section lines, divide the plat into an east half and a west half OR a north half and a south half (which ever applies).					
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b. Pilarski 1-12, Permit #00340



DEPARTMENT OF NATURAL RESOURCES Geological Survey Division

REQUEST FOR CHANGE OF OWNERSHIP OF A PERMIT (Submit all copies)

Please Change:	
Permit No. 1242-831-354 Type Well Mineral Test Field Name Hersey-Evart	
Owned by PPG 0il & Gas Co., Inc.	
Address 2258 Enterprise Drive, Mt. Pleasant, MI 48858 (517) 773-3949 (street) (town) (state) (zip) (phone)	
for <u>Pilarski</u>	NE 1
section 12, T. 16N, R. 9W, Grant Township, Mecosta Cour	nty,
to PPG Industries, Inc. (acquiring owner-complete names please)	
	•
All operating rights are discharged by (us) (me).	
(Owner) (Representative) (Signature) (Date) PPG 0il & Gas Co., IncDonald D. Metzger (Date))
PPG Oil & Gas Co., IncDonald D. Metzger Wound Wolfger 4-17	<u>'-\$</u>
THE SUPERVISOR IS PROHIBITED BY STATUTE FROM ISSUING A PERMIT TO ANY PERSON WHO IS NOT IN COMPLIANCE WITH THE PROVISIONS OF THE ACT, THE RULES, OR THE ORDERS OF EITHER THE SUPERVISOR OR THE NATURAL RESOURCES COMMISSION. ELIGIBILITY FOR PERMITS IS CONDITIONED ON COMPLIANCE WITH SUCH RULES AND ORDERS IN A DILIGENT MANNER AND IN ACCORDANCE WITH ACCEPTED OIL FIELD PRACTICE. (We) (I) have acquired the well under this permit and assume full responsibility for driling, operation, and abandonment in conformity with the law, regulations and orders issued by the Supervisor of Wells. The bond(s) required is attached or already on file.	R- M-
DDC Industrias Inc	
PPG Industries, Inc. (acquiring owner-complete names please)	
Address 2258 Enterprise Drive, Mt. Pleasant, MI 48858 (517) 773-3949 (street) (town) (state) (zip) (phone)	9
All operating rights and responsibilities are assumed by (us) (me).	,
(Owner) (Representative) (Signature) (Date) $i() \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ \circ$,
PPG Industries. Inc Donald D. Metzger Journal V. Molingo 4-17-	-84
THE DEPARTMENT OF NATURAL RESOURCES DAILY	
Approved. (Signature) Approved. (Signature) Approved. (Date) Approved. (Signature) (Date) Approved. ıer	
R-7214 (Rev. 10-79)	

R 299.1105. Transfer of permits

Rule 105.

(b) Change of ownership of a well

Should the person who has obtained a permit to drill dispose of his interest in the well to a new owner before drilling is commenced, while the well is being drilled, or after the well has been completed, a notice of the change of ownership and a request for the transfer of the permit to the new owner shall be submitted to the supervisor on forms prescribed by him. The transfer of the permit may be approved on receipt of a properly-prepared request, including the signatures of the operator of record and the acquiring operator, and the required surety bond of the acquiring operator.

Should the owner of record or the acquiring operator fail, neglect, or refuse to file a notice of change of ownership and request the transfer of a permit for a producible well, the supervisor may require suspension of production from the well until the request for transfer has been filed and approved.

Should the owner of record be under notice because of unsatisfactory conditions on the lease involved with the transfer of a permit, the supervisor may require suspension of production from the well on said lease until:

- (1) The owner of record has corrected said unsatisfactory conditions and the permit has been transferred to the new owner; or until
- (2) The acquiring operator by written agreement with the supervisor has corrected said unsatisfactory conditions and the permit has been transferred as provided herein.

A permit for a well which has not been drilled, or for a well which is being drilled, may not be transferred to a person who is not in compliance with the statutes, rules, regulations and orders as provided in rule 104.

R 299.1105a. Suspension of production on default

Rule 105a. Should the owner of record sell or dispose of a well without filing a notice of change of ownership and a request for transfer of the permit, the supervisor may require suspension of production from the well, including removal or sale of oil from the lease, until correction has been made of all unsatisfactory lease conditions and transfer of the permit has been completed as provided in rule 105 (b).

R 299 Stro6. Surety bond; required

duires a west or wells as provided in rule 101, or who duires a west or wells as provided in rule 105, shall file a surety bond with the supervisor, on a form provided by the supervisor, which has been executed by a responsible surety company authorized to do business in the state of Michigan.

NOTE cash may be deposited in lieu of a surety bond.

MINERAL WELL PLUGGING RECORD

File in DUPLICATE Within 30 Days After Plugging is Completed

PERMIT NUMBER 1242-831-354

							DATE		
							2/2/84		
DWNER OR OF	PERATOR			- , 					
PP	G 0i1 & Gas	Co., Inc.					I		
ADDRESS								<u> </u>	,
22	58 Enterpris	se Drive, Mt.	Pleasant,	MI 48	858				"
WELL NAME							WELL NUMBER		
Pi	larski					1	1-12		
MELL LOCATI	-					_	TOWNSHIP	COUNTY	
C 1/4	NE ¼	NE ¼ SEC	. 12 T	. 16N	11,	9W	Grant	Mecosta	l
	L (Brine Disposal S	Storage or Test)			TOTAL DE		FORMATION		_
	st Well				7937		Niagaran		
DATE PLUGGH		1	SING COMPLET	ED	OBTAINED	SSION OF I BEFORE PI	DEPT OF NATURAL RESC LUGGING BEGAN?		_
	-18-83	SENTATIVE WHO A	1-18-83	5.055				XXYES	DNO
	n Gunning	SENTATIVE WHO A	O HOHIZED O	K SUPER	(VISED PLUG	UING.			
	ii Guintiig		····		<u> </u>		<u> </u>		
	Γ	1	1	1			- i		
CASING SIZE	WHERESET	AMOUNT RECOVERED	SHOT OR RIPPED	1	TYPE C	OF BRIDGE	ES OR PLUGS	DEPTH PLACED	NUMBER SACKS
24"	45			Ceme	nt.			7937-6015	530
13 3/8"	946			Ceme	•			6015-5590	290
9 5/8"	* 5480			- Ochic					
					· · · · · · · · · · · · · · · · · · ·				**
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í	<u> </u>						<u> </u>		·
	DETAIL HOW WEL							~^^ <u>-</u>	
							led drill pipe to	6013 and	
sp	otted 290 s	k, pulled dri	<u>ll pipe and</u>	<u>l wait</u>	ed on cen	ment.			
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					<u></u>				
			· · · · · · · · · · · · · · · · · · ·						
							(USE R	EVERSE SIDE	IF NEEDED!
 -	- <u></u>								
Were tools tul	bing casing etc.	lost or left			l f	yes give	details:		
in the hole bef	fore or during plu	igging?	YE	s 🛭	X NO				
		 							
	Company pump r			_		yes, give	name and address:		
spot cement ic	or set bridge plug:	s?	XX YE	ES L	ON	налл	burton		
Mus the well n	lugged by a Com	חפתע הי			14	ves oive	name and address:		
	ner than Owner o		ΠY	es 🛭	Д ио	Aes Asse		al sid	ICV
ocini betor on	ici tiani omici o	· Operator	٠٠ نسبا	-0 &	<u> </u>		724 S 30 S 324 S 3) 1 1 1
Representatives	of Owner, Operator	Company or Contra	sctor who witnes	sed plugg	ing				
		Marvin W	oods				FEB	2 8 1984	1
					FICATE	- <u>-</u>			
ı, <u>Wi</u>	.11iam E. Boo	oker		of St	rickler (Geologi	cal Services, Inc	·(c	ompany)
state that Lam	authorized by sa	aid Owner or Opera	tor to make th	is repor	t; and that th	is report v	vas prepared ប៉ុន្តែ ប៉ុន្តែការីម	űpervisionszali	Tonedion
ond mar me is	cts stated herein	are true, correct a	TO COMPIETE TO	THE DES	COI IIII KIIOII	vieoge.			
SIGNATURE	, III ,	Rad	ADDRESS 14			r //00E0	TITLE	•	
<u> </u>	Menz	120000			asant, MI	L 40038	Geologist		
DEPARTMENT	REPRESENTATIV	'E	FII	TAL IN	STECTIONS			DATE	
DEPARTMENT	HI PRESENTATIV	'E	- · · · · · · · · · · · · · · · · · · ·					DATE	

	OPERATORS USE	:
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aplemental Plugging Data and Site Conditions:	DEPARTMENT USE ONLY .	-
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MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS FEB 2 4 1984 AFTER COMPLETION OF WELL (ACT 315, P.A. 1969)

SUBMIT IN TRIPLICATE

NAME OF	OWNER C	R C	PERA	TOR			-		ADDRE	ESS OF OWNER	OR OPER	TOR		 ,	· · · · · · · · · · · · · · · · · · ·
PPG Oil & Gas Co., Inc.					2258 Enterprise Drive Mt. Pleasant, MI 48858										
NAME OF	DRILLING	CC	NTRA	CTOR			<u>-</u>			ESS OF DRILLIN			R		
					_										
T. D	. Provi	lns	Dri	lling	g Co.					l3 Enterpri: . Pleasant,					
Mer L NA									<u> </u>		PERMIT		50		
WELL NAM Pila									1	NUMBER -12	7		ен 831-35	54	
LOCATION	- CKI								SECTIO		TWP.			RANGE	
C NE	NE								1	L2		16N		1	9W
TOWNSHIP				a					COUNT		- 	· · · · · · · · · · · · · · · · · · ·			
Gran	t 									Mecosta	~ -~	·			
FOOTAGE	844			Ft. fro	m <u>No1</u>	th or S		Line and	666		E	East or W	L	ine of qua	erter section
DATE DRIL 10-2		ME	NCED		DATE DRIL 1-1	LING 0 84	COMP	LETED	DATE	WELL COMPLET 1-3-84	ED	TY	PE OF V	well est Hol	e
FORMATIO	N COMPL	ETE	D IN		TOTAL DEF 8290, 8		831	8, 7937	ELEVATI	ON KB 1215.4	RB	RT		BF 1213.	GN 9 1199.
ROTARY T	ools	~—							CABLE	TOOLS	 			_	
From	0			Feet	to	831	L8	Feet	Fron	From Feet to					Fee
							W	ELL CASI	NG RECC	ORD					
т	UBING A	ND	CASIN	G DA	TA			CEMENTI	NG DATA		PE	RFOR	ATIONS	OR OPE	N HOLE
SIZE	LB./FT.		GRA	DE	DEPTH	SAC	KS	TYPE	STAGI	NG DEPTH(S)	NO. HO	LES	F	ROM	то
24"	64#_				45	DP							<u> </u>		
13 3/8"					946	900		700 Lt-					 		<u> </u>
9 5/8"	40#				5480 '	1585	SX	1702 P£	330 61	L A 0-3650 3650-59	<u> </u>		 		
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TOTAL	(Fresh)		1010		7.000			hlumberg		LDT-CNL-G	~ 				Yes
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DATE	<u> </u>	FF	ROM	то	QUANT	ITY		NAME AND	NUMBER	OF INJECTION	AND TAR	GET V	NELL	DISTANC	E APART
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					The inform	ation in	ənd	attached to	this report	is complete and	consect		1 2 m 1 1	الله عد تنا ويه علا دغ	4
SIGNATURE	10							TITLE	·					DATE	
11/1	Kun	\leq	- G	ىسەرك	b			W:11:	am E. P	Booker, Geo	logist			2/2/	84

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11-29-83 - Skipper/Todd

Mineral Well - CONFIDENTIAL

Mecosta, Grant, Hersey 1242-831-354 PPG Oil & Gas Pularski 1-12

DRILLING

Provins Rig 7 RIH @ 8048. A-1 Ev. 7915 MD. Dev. Surveys

MD	Dev.	TVD	Obs. Dir	. Reci	t. Co-Ord.
6112	15₺	6108	мззи	495	74W
6237	25½	6224	N33W		
6330	30⅓	6307	N30W		
6390	34-3/4	6357	N31W		
6497	37፟፟፟፟፟	6444	N30W		
6672	36⅓	6584	N30W		
6884	34-3/4	6760	N31W		
6983	35	6837	N29W	3521	N 315W
7107	35-3/4	6938	n31w		
7263	36	7065	N29W		
7419	34-3/4	7192	N29W		
7576	34-3/4	7320	N29W		
7733	36-3/4	7447	N29W		
7889	37	7571	N29W	814N	565W
7960	37दे	7628	N29W	852N	595W

Coring A-1 Ev., wouldn't disclose interval.

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GOLOGICAL SURVEY

1- -383

CO - EC - 500 - 500 海山海岸的 在海岸的复数形式

GEOLOGICAL SURVEY FIELD REPORT Mt. Pleasant

//le

CONFIDENTIAL

Mineral Well

11-23-83 - Skipper

Mecosta, Grant, Hersey (Clinton)
PPG 0il & Gas

Pilarski 1-12

DRILLING

Provins Rig 7 drlg. 7-7/8" @ 6190. KOP for directional redrill at 5852 in F Salt. Dir. Surveys:

MD	Dev.	TVD	Dir.	Rect. Co-	ordinates
5800	7/8	5799		76S	52W
5988	7눌	5986		70S	63W
6112	15克	6108	N33W	49S	74W

+ + + + +

GEOLOGICAL SURVEY

NFC-2 1983

HATTER TOKE THE BRINGS OF THE PROPERTY OF THE

J. L. WILCOX & ASSOCIATES, INC.

7230 North U.S. 131 MANTON MICHIGAN 49663 PP & Belt

				W
LETTER	0F	TRANS	SMIT	TAL

(616) 824-6415 TO Geological Survey Division Dept. of Natural Resources P. 0. Box 30028 Lansing, MI 48909 WE ARE SENDING YOU Attached Under separate cover via the following it Shop drawings Prints Plans Samples Specific Copy of letter Change order Well Elevations Description Description Description Description Description Description Description	
Dept. of Natural Resources Pilarski #1-12 Permit #1242-831-354 Section 12, T16N, R9W	
Dept. of Natural Resources P. 0. Box 30028 Lansing, MI 48909 WE ARE SENDING YOU Attached Under separate cover via the following it Shop drawings Prints Plans Samples Specific Copy of letter Change order Mell Elevations COPIES DATE NO. DESCRIPTION	4348
P. O. Box 30028 Lansing, MI 48909 WE ARE SENDING YOU Attached Under separate cover via the following it Shop drawings Prints Plans Samples Specific Copy of letter Change order Well Elevations COPIES DATE NO. DESCRIPTION	
Lansing, MI 48909 WE ARE SENDING YOU Attached Under separate cover viathe following it Shop drawings Prints Plans Samples Specifi Copy of letter Change order Well Elevations COPIES DATE NO. DESCRIPTION	>
WE ARE SENDING YOU	
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GEOLOGICAL SURVEY	
NOV-4 1983	
M/V 4 1903	
	THE RESIDENCE OF THE PROPERTY
THESE ARE TRANSMITTED as checked below: □ For approval □ Approved as submitted □ Resubmit copies for approved as submitted □ Resubmit	nnroval
☐ For your use ☐ Approved as noted ☐ Submitcopies for distr	
☐ As requested ☐ Returned for corrections ☐ Return corrected prints	
☐ For review and comment ☐	
☐ FOR BIDS DUE	TO US
REMARKS Elevations for subject well are as follows:	
Ground = 1199.0	
Platform = 1213.9	
T KDB = 1215.4	
NOTE: above elevations are U.S.G.S. datum.	
-	
COPY TO PPG 0il & Gas Co., Inc.	

STATE OF MICHIGAN



JAMES J BLANCHARD Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING BOX 30028 LANSING MI 48909

RONALD O SKOOG Director

October 10, 1983

to s

Mr. Donald P. Smith PPG Oil & Gas Co., Inc. 2258 Enterprise Drive Mt. Pleasant, MI 48858

Dear Mr. Smith:

NATURAL RESOURCES COMMISSION THOMAS J. ANDERSON R. CAROLLO

JOBIA HOEFER STEPHENIF MONSMA

HILARY F. SNELL PAUL H. WENDLER

HARRY'H WHITELEY

Enclosed is Mineral Well Permit #1242-831-354 to drill and abandon mineral exploration well in C, $NE\frac{1}{4}$, $NE\frac{1}{4}$, Sec. 12, T16N-R9W, Grant Twp., Mecosta County, Michigan. This permit was issued under the provisions of the "Mineral Well Act", Act 315 PA 1969, as amended.

Records of wells drilled under this permit are due within 60 days of completion. For information on contents of these records, please refer to Rule 72(a). These records and supporting information will be held confidential as per Section 17(5) and Rule 73 of the Act.

Whenever possible, please indicate County, Township & Range on each record sent into our office.

Thank you for your cooperation with us on these matters.

Sincerely

A.J. Rarick, Acting Chief

Mineral Well Unit

Geological Survey Division

AJR:bb Enclosures

MINERAL WELL PERMIT

For a Test Well(s)

		ŧ	Permit No. 1242-831-3	54
		[Date Issued 10-10-83	Date Expires 04-10-83
	ranted to <u>PPG Dil & Ga</u> Drive, Mt. Pleasant,	•	(name)	
		(address)		
to <u>drill and aba</u>			ineral exploration	
to be located in <u>C, N</u>	E¼, NE¼, Sec. 12, T16A	I-R9W, Grant T	wp., Mecosta Cour	nty, Michigan —
				RB RF
Pilarski (well name)	112 (well number)	Niagaran (formation)	8,000 I (intended depth)	RT GN
SPECIAL INSTRUCTION HOLES TO BE	NS: PLUGGED WITH NEAT CEN	ENT FROM BOTT	OM TO TOP.	
	provisions and requirements or of Mineral Wells and the Do			ules, requirements, or orde
SUPERVIS	SOR OF MINERAL WELLS	By: Title: Addres	A.J. Karick, Ass: Mineral Well t	Acting Chief
Please address all not and records to:	ifications, correspondence,		Geological Sur Dept. of Natur	vey Division
		Teleph	one: 517/373- 9289)

1. This permit is issued on the basis of the approved program outlined in the application. No changes or alterations are to be made without the permission and approval of the Supervisor of Mineral Wells or his authorized representative.

- NOTICE -

- 2. This permit, or a copy thereof, shall be posted at a conspicuous place at the well location or be in the possession of the driller.
- 3. It is further made a requirement of this permit that the applicant (or contractor) give notice to the public utilities in accordance with Act 53, Public Acts of 1974, Compiled Laws 460.701 to 460.718 and comply with each of the requirements of the act.
- 4. An unusual, unexpected, or difficultly controllable large volume of oil, gas, brine or flowing fresh water or a condition hazardous to public health, safety, or waters of the state shall be reported immediately to the Supervisor.

Distribution: Linen-applicant—2-Lansing—3-field—4-applicant.

State of Michigan Department of Natural Resources FIELD REVIEW OF PROPOSED WELL SITE

MAT = 3 to 3

MINERAL WELL

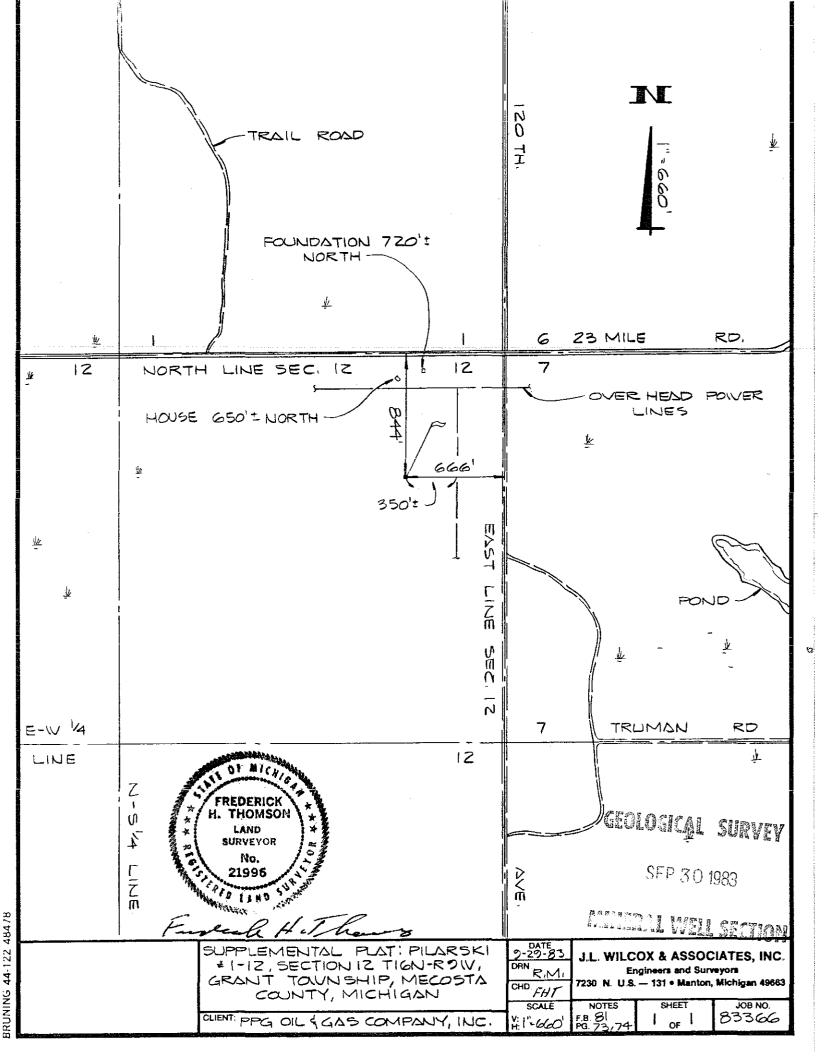
1.	Date of Inspection:	10-3-83		Ge as an experienced that the second of	and the
2.	Name of Applicant:	PPG Oil& Gas Co.	Inc.		
3.	Well Name & Number:	Pilarski 1-12			
4.	Legal Description:	SE NE NE. Sec.12	. T16N-9W. Grant Tv	vp. Mecosta Co.	
5.	[] PR or [] DJ - Surfa	ace Owner: Daniel	A. & Saundra A. Pi	larski	
6.	Ownership Pattern:	N/A			
7.	Land Use of the Area:				
8.	Cover Type/Density:				
9.					
	Topography:	Gand Candy Joan	Desire as Cood		
10.	Soil Type & Drainage:	topo to Surface We	Drainage- Good		
11.	Type, Direction & Dis	taile to Surface wa	icers: None within 7	·mr.	
-					
10	Woll City Dimonished			/ 3 3	
14.	Well Site Dimensions:	:		(3,7	·Acres)
13.	Access Road Length, W.		eciai Requirements:	600 of new trail	
_	will be constructed.				
		· ·		(Acres)
	Were soil erosion and			ately considered?	
	$X_{\underline{X}}X_{\underline{X}}$ Yes [] No If not,	specify additional	L requirements:		:
5 -					
15.	Wildlife concerns:	Minimal			×
		-			
_					
16.	Fisheries concerns:	Minimal			Ţ.
	· ·				1 -5
_					()
17.	Timber Damage Apprais	al (State Surface):	: N/A	<u> </u>	
		•			
•					
18.	Nearby Scenic, Histor	ical or Recreations	al Areas: None		
•					
19.	Is it reasonable to e	xpect to encounter	Has during drilling	n2 Yes	
	Are proposed arillin	o practices agenu	ate for Hos safet	v2 X Ves I No	
	recommend additional	requirements:	34,56	y: <u>Fi</u> les <u>Li</u> wo	II HOU,
	2000,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1040110			
-					
20.	Is the Environmental	Impact Assessment	accurate and accent	able? X Ves No	If not
20%	specify additional s.	ite construction	requirements and/or	restrictions Com	ments if
	•				miches II
	any:				
-	4				
	o To on unlined co-	thon nit to -co-i	o from atom	do onion to oottie	al infant
	a. Is an unlined ear	ulen pit to recei	ve iresh water mu	us prior to setting	Surrace
	casing: Ki Yes []	No it yes, explai	in: Fit utilized for	fluids from the sur	race
_	to setting point of tb. Is a 20 mil PVC 1	he surface caseing	•		
	b. Is a 20 mil PVC l	iner to be used fo	r pits receiving dr	illiny fluids from t	oelow the
	surface pipe? <u>[k]</u>	Yes [] No If no, a	explain:		
_					
					

c. How are salt cuttings to be ha	andled? Cuttings will be dissolved, and brine
d. Are all fluids in the lined p [X] Yes [] No If no, explain:	oit to be removed and disposed of in approved method?
e. Are drilling muds and cutting folded over liner and/or an a	gs to be removed <u>or</u> totally encapsulated within the additional impermeable cover as needed, for burial at r? XX Yes [] No If no, explain:
f. Is approval of the encapsulati [X] Yes [] No If no, explain:	on to be received from the District Geologist?
	est procedures, all fluids must be contained in stee. eved facilities for disposal. Comments:
Ren Gunning	tacted? K] Yes [] No Comments:
time the District Geologist will	ed upon well completion or site abandonment. At that develop specifications in keeping with the State Land ctives.
ON THE BASIS OF THE REVIEW FINDIN IXIXIX DO [] DO NOT RECOMMEND ISSUA	IGS: INCE OF A PERMIT TO DRILL THIS SITE.
DISTRICT GEOLOGIST'S COMMENTS: 5	ee Addendum to Field Review.
GEOLOGICAL SURVEY DIVISION:	BY: (ou 10-3-83 (date)
LAND MANAGER'S COMMENTS:	(Signature) (date)
LAND MANAGER (If State Surface):	(signature) (date)
REGIONAL DIRECTOR'S COMMENTS:	
REGIONAL DIRECTOR:	BY:
	(signature) (date)

SURVEY RECORD OF WELL LOCATION

(Submit five copies with Application for Permit to Drill a Well for Oil or Gas, Brine Disposal, Hydrocarbon Storage or Secondary Recovery)

83366			Dillie Di	sposai, i			- Or Oecond		, v e i y j		
LESSEE (OV	WNER OF	LEASE RIGH									
LESCOR (O)	ABICE OF	MINERAL RI		_ & GAS	COMPANY, I	NC.				IME	LL NO
LESSON (O	WINER OF	WIINERAL DI	GH 13/				(Pilars	ki 1-12	١	1	-12
LOCATION							11 114131	<u> </u>	<i></i>	<u>1</u>	1 =
	SE	¼ OF	NE	¼ OF	NE		SECTION 12		т. 16 N		R. 9 W
TOWNSHIP						COU					
Grant		DEDDECEN	TC () N C		TION A	1	<u>Mecosta</u> Outline drill	lina unit	and spot	well lo	cation on plat
PLAT	BELOW	REPRESEN (1 Mile S	Square)		666	2.	at left. Whe divide the p a north half Outline the directions filines. Location of quarter sec 844 ft. ft. ft. ft. ft. ft. ft. ft. ft. ft.	ere drilling and a second new NEA well in the second new Nea well in the se	ng unit or an east hal outh half and locate REST qua two direct unit line th line west) line south) line	rosses If and a (which e the arter se ions fr s is: of Qua of Qua of unit	section lines, a west half OR ever applies) well in two ection and unit
1886868448000856			1202900110000		SEP 30 1983		Wellsite stake. off of 2 plat.	e is man Site ca 23 Mile	rked with an be rea Road.	h a pa ached See si	from North upplemental
	(Scale	e of Plat — 1	inch equa			3 3 3 A	datum.	Elevati		8.2 f	eet, U.S.G.S.
E	A Local struct 3 Local surfa	tures withi te, identify ce water f	, and sho in 300 fe , and sh eatures v	ow distan eet of the how dista within 13	ices to all roa e stake; ances to all 120 feet of th	lakes, e stał	streams, swi ce.	amps, d	açin bili	REDERI HEHOM LAND LAND 21996	CK Seniciother or any other
C	detailing	plans fo	r hazaro	ds prevei	SSESSMENT ntion and er pact assessn	osion					
NAME OF IN	IDIVIDUA	WHO SURV	EYED WEI		erick H. The	omson	DATE , LS#21996	9-30-8	TITLE 33 Surv	veyor	
ADDRESS J. L. W	ILCOX 8	ASSOCIA	TES. IN		7230 North	<u></u>			Michigar		53
			=		MPLETE AND			_	_		
					(E) ADDRESS (IF						NTH DAY YEAR)



PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries Inc

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



September 30, 1983

Mr. Al Rarick Department of Natural Resources Geological Survey Division P. O. Box 30028 Lansing, MI 48909

Dear Mr. Rarick:

Re: PPG Oil & Gas Co., Inc. Standard Casing and Cementing Procedures

Listed below are PPG Oil & Gas Co., Inc. standard casing and cementing procedures:

- 1. Drive 24 pipe as deep as possible. This allows us to set 20" conductor inside and lower if trouble occurs with washout under conductor pipe while drilling surface hole.
- 2. Drill 17 1/2" hole to base of drift or to a firm footing as determined by geologist from samples.
- 3. Run 13 3/8" S.T.C. 48# Seamless H-40 casing equipped with Texas pattern weld on shoe. A float collar is set 30', or one joint, off bottom. The lower 5 joints of casing are strapped across collar in either two or three sectors. Top and bottom cement plugs with no centralizer as recommended by cementing company (see attached).
- 4. We also run a cement basket approximately 50' below surface, making sure cement is circulated back to surface.
- 5. We then drill 12 1/4" hole into Bass Islands formation or the Amherstburg if local drilling shows no lost circulation zones in the Bois Blanc and set 9 5/8" L.T.C. 40# N-80 grade pipe with a guide shoe on bottom with float collar first joint up and all bottom 6 joints secured with Weld-A or Baker Lok or some similar material.
- 6. Centralizers are run per cementer's recommendation attached.
- 7. For both the surface and intermediate casings, the lower joints of casing are roughened unless they appear rusty as this provides a much better bond for cement.

Sincerely,

Donald P. Smith Exploration Engineer CICLO STAL SURVEY

SEP 30 1983

DPS/blb Attachment

CALLERAL WELL SECTION

Surface Casing (13 3/8" in 17 1/2" hole @ 750')

- A. Use insert float and Texas Pattern Shoe and lock to shoe joint with thread lock.
- B. No centralizers
- C. Circulate hole a minimum of one complete circulation
- D. Do not reciprocate casing
- E. Run bottom (red) wiper plug. Do not use if carrying LCM in cement.
- F. Pump 70 bbls. fresh water ahead of cement
- G. Cement with:
 - 1. 475 sx 50/50 Poz., 6% total gel, 3% CaCl₂ 1.54ft³/sk, 13.3#/gal, 7.66 gals/sk
 - 2. 200 sx Class "A", 3% CaCl₂ 1.18 ft³/sk, 15.6#/gal, 7.66 gals/sk

Intermediate Casing (9 5/8" in 12 1/4" hole @ 5100') Recommended Procedure:

- A. Use float collar and guide shoe and lock to shoe joint with Halliburton Weld-A
- B. Run one centralizer 10' above guide shoe and four more at every other collar spacing.
- C. Circulate hole a minimum of one complete circulation and until the drag stabilizes.
- D. Reciprocate casing while circulating and cementing. Stop reciprocation just prior to bumping top plug.
- E. Run bottom (red) wiper plug. Do not use if carrying LCM in cement.
- F. Pump 30 bbls, fresh water ahead of cement.
- G. Cement with enough cement from caliper log to bring cement to surface on all intermediate casing strings.
- H. Run top (black) wiper plug.
- I. Displace with fresh water.

Casing Equipment: (9 5/8")

Regular guide shoe, float collar with auto fill, Halliburton weld-A (2), Centralizers (5)

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries, Inc.

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



September 30, 1983

Mr. Al Rarick
Department of Natural Resources
Geological Survey Division
4th Floor, Mason Building
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Rarick:

Subject: PPG Oil & Gas Co., Inc. Testing Program

The test well covered by this application is being drilled into the top of the Niagaran formation to approximately 8,000'. The primary objective is evaluation of the potash mineralization of the A-1 Evaporite, which occurred in the interval -7,579' to -7,931' in the Freudenburg 1-31 well located in the SE/4 NE/4 NE/4 of Section 31, T17N, R8W, Osceola County, Michigan.

The testing program will consist of cutting 4" cores through the anticipated potash mineralized section. Then gamma ray, neutron and other geophysical logs will be run at total depth.

Geophysical logs will also be run from the base of the surface casing to total depth. Sample cuttings will be retained and sample descriptions will be submitted with the plugging record. Potential disposal horizons will be drill stem tested.

Sincerely,

Donald D. Metzger

Director, Exploration & Michigan Operations

DDM/blb

GEOLOGICAL SURVEY

SFP 30 1983

Exhibit #2

Bankana and Bankana Samakana da



PPG Industries, Inc. 2250 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949

September 30, 1983

Mr. Al Rarick
Department of Natural Resources
Geological Survey Division
4th Floor, Mason Building
P.O. Box 30028
Lansing, MI 48909

Re: Casing Removal and Plugging

Dear Mr. Rarick:

Upon completion of the coring and logging of the test well covered by attached permit application the well may be abandoned and plugged. If not abandoned, change of status will be requested at a later date.

Plugging will consist of running open end drill pipe to T.D. and setting continuous cement plugs to surface. The casing will be cut off at least 3 feet below surface and a 1/2" steel plate welded over the top of surface casing stub.

The cellar will be removed and backfilled according to D.N.R. specifications.

Sincerely,

Donald P. Smith Exploration Engineer

DPS/blb

GEOLOGICAL SURVEY

Exhibit #3

SEP 30 1983

Maria Salana



PPG Industries, Inc. 2250 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949

September 30, 1983

Mr. Al Rarick
Department of Natural Resources
Geological Survey Division
4th Floor, Mason Building
P.O. Box 30028
Lansing, MI 48909

Re: Casing Removal and Plugging

Dear Mr. Rarick:

Upon completion of the coring and logging of the test well covered by attached permit application the well may be abandoned and plugged. If not abandoned, change of status will be requested at a later date.

Plugging will consist of running open end drill pipe to T.D. and setting continuous cement plugs to surface. The casing will be cut off at least 3 feet below surface and a 1/2" steel plate welded over the top of surface casing stub.

The cellar will be removed and backfilled according to D.N.R. specifications.

Sincerely,

Donald P. Smith Exploration Engineer

DPS/blb

CEOLOGICAL SURVEY

Exhibit #3

SFP 3 0 1983

President of State of Action

c. Johnson 1-6, Permit #36067



AMENDED 2-1-88	
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(1385-821-354)	
DATE	
12-21-82	

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MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315, P.A. 1969)

SUBMIT IN TRIPLICATE

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Strickler Geological Services, Inc.

1425 SOUTH MISSION ROAD . MT. PLEASANT, MICHIGAN 48858 . (517) 772-2107

December 21, 1982

Department of Natural Resources Geological Survey Division P. O. Box 30028 Lansing, MI 48909

Dear Sirs:

Please find enclosed two (2) copies of the Mineral Well Plugging Record and two (2) copies of the Well Plugging Record which have been corrected, on the Johnson #1-6 located in the NE% NW% SW% of Section 6, Chippewa Township, Mecosta County.

If you have any questions, please feel free to contact me.

Sincerely, William & Booker

William E. Booker

/ljb Enclosures

MINERAL WELL PLUGGING RECORD

File in DUPLICATE Within 30 Days After Plugging is Completed

PERMIT NUMBER	
36067 (1385-821-	354)
DATE	, , , , , , , , , , , , , , , , , , ,

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OWNER OR OP	FRATOR					12-21-02		
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OPERATORS USE **DEPARTMENT USE ONLY** Supplemental Plugging Data and Site Conditions:

Strickler Geological Services, Inc.

1425 SOUTH MISSION ROAD . MT. PLEASANT, MICHIGAN 48858 . (517) 772-2107

December 9, 1982

Mr. Bob Ives
Mineral Wells
Department of Natural Resources
Geological Survey Division
P. O. Box 30028
Lansing, MI 48909

RE: WILLMET, INC.
Johnson #1-6
NE NW SW, Section 6, T16N R8W
Chippewa Township, Mecosta County

Dear Mr. Ives:

Enclosed please find the following on the above referenced dry hole.

- 1. Mineral Well Plugging Record 2 copies.
- 2. Mineral Well Completion Report 2 copies.
- 3. Sample Description 2 copies.

If you have any questions, please feel free to contact me.

Sincerely,

William E. Banker

William E. Booker 2

/1jb Enclosures

CEOLOGICAL SURVEY

DEC 1982

MINERAL WELL PLUGGING RECORD

File in DUPLICATE Within 30 Days After Plugging is Completed

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MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315, P.A. 1969)

SUBMIT IN TRIPLICATE

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FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

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2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

October 29, 1982

Mr. Robert E. Ives, Supervisor Mineral Wells State of Michigan Department of Natural Resources Geological Survey Division P. O. Box 30028 Lansing, MI 48909

Re: Sidetrack of the Johnson 1-6

Dear Mr. Ives:

As discussed with your personnel prior to taking the action, Willmet plugged back and sidetracked the Johnson 1-6 located in the NW/4 of SW/4, Section 6, T16N, R8W, Mecosta County, Michigan. This operation was made necessary due to a mechanical problem which occurred during a coring operation which resulted in loss of the core. A cement plug was set with the top of the cement being at 6,640 feet, and the well was sidetracked to the east approximately 40'.

We were informed prior to conducting this sidetracking operation that no permit was required. This letter is for your information and for file purposes.

Sincerely,

Donald D. Metzger Director, Exploration

& Michigan Operations

DDM/.ilc

cc: Al Rarick

VIOLIT STEEL SECTION

To: Lunaiah lo	Thecamury	FROM: Wayn +	T. Todd	
T.O.C.			OUR JOB NO.	1-6-83
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SIGNED

DATE

ORIGINAL

SENDER — Retain part 2 for your follow-up, send parts 1 and 3 to addressee RECIPIENT — Retain part 1 and return part 3

MINERAL WELL PERMIT For a Test Well(s)

			Permit No.	വല ദേശ ചെട്ട		
			Date Issue	<u>385-821-35¹</u> d /2/82	Date Expir 3/2/	
Permission is hereby gran	nted to <u>VILLMET, IN</u> 2250 Enterp		(name Ploasant) Michigan	48858	
to	n		min	oral explo	ration	
Johnson 1-6 (well name)	(well number)	Nlagaran (formation)	(ir	8,000 thended depth)	RB 'À}\$@##	RF GN (elevation)
SPECIAL INSTRUCTION 24 HOUR NOTE AND LOCGING	S: FICATION PRIOR TO ACTIVITIES IS REQU	STARTING DATE, IRED.	CASING,	CEMENTING /	AND PRESS	SURE TESTS
Permit is subject to the pro- issued by the Supervisor		Department of Na By:	tural Resour		es, requirem	ents, or orders
Please address all notific and records to:	cations, correspondence		ress: S M G	nnaidh Poth upervisor c ineral Rell eologleal S NR	of Test N L Unit	į.
		Tele	phone: $rac{\mathrm{B}}{\mathrm{L}}$	ox 30028 ansing, MI 517) 373-92	48909 289	N.

- 1. This permit is issued on the basis of the approved program outlined in the application. No changes or alterations are to be made without the permission and approval of the Supervisor of Mineral Wells or his authorized representative.
- 2. This permit, or a copy thereof, shall be posted at a conspicuous place at the well location or be in the possession of the driller.
- 3. It is further made a requirement of this permit that the applicant (or contractor) give notice to the public utilities in accordance with Act 53, Public Acts of 1974, Compiled Laws 460.701 to 460.718 and comply with each of the requirements of the act.
- 4. An unusual, unexpected, or difficultly controllable large volume of oil, gas, brine or flowing fresh water or a condition hazardous to public health, safety, or waters of the state shall be reported immediately to the Supervisor.

Distribution: Linen-applicant—2-Lansing—3-field—4-applicant.

2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

August 30, 1982

State of Michigan Department of Natural Resources P. O. Box 30028 Lansing, Michigan 48909

Attention: Mr. Bob Ives

Re: Request for Test Well Permit under Mineral Well Act, NE/4 NW/4 SW/4 of Sec. 6, T16N, R8W, Mecosta County, Michigan

Dear Mr. Ives:

An application for a Mineral Test Well for the Johnson 1-6, at the referenced location, was submitted on August 13, 1982. This application provided for directional drilling so that the bottom-hole location would be 95' east of the surface location. In view of the current interpretation that directional drilling is prohibited under the Mineral Well Act, please consider this letter as a revision to that application, with a revised bottom-hole location corresponding to the surface location.

Your cooperation is appreciated.

Sincerely,

Donald P. Smith Exploration Engineer

DPS/jlc

cc: Ty Black Wayne Todd Sam Alguire

GEOLOGICAL SURVEY

SEP 1 1982

State of Michigan Department of Natural Resources Geological Survey Division

FIELD REVIEW OF PROPOSED WELL SITE

(RETURN to Geological Survey)

Name of Applicant: Mell dame & Number: Legal Description: NE NW SW Sec 6 TIGN-R8W Chippeva Township Mecosta County Donald W. and E. Caroline Johnson (If other than mineral owner) Concert Type/Density: Land Utilization: Land Utilization: Agricultural and Recreational uses (Specify direction and distance) Is there any type of surface water nearer than one-quarter (1/4) mile? No (Specify direction and distance) Is the invironmental Impact Assessment accurate and acceptable? Yes Are there any special drill site construction requirements and restrictions? No (Specify) Inspected by: (Agnature) (Signature) (Signature) (date) (date) (date)		Date of Inspect	ion: 8-17-82
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WILLMET INCORPORATED

2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

August 13, 1982

State of Michigan Department of Natural Resources P. O. Box 30028 Lansing, Michigan 48909

Attn.: Mr. Robert Ives

Re: Request for Test Well Permit under Mineral Well Act, NE/4 NW/4 of SW/4, Section 6, T16N-R8W, Mecosta County, MI

Dear Mr. Ives:

Enclosed herewith please find our check in the amount of \$1.00 for the fee for a Mineral Test Well Application for the above noted location. This Mineral Test Well Application is submitted as a replacement for the Test Well Permit, No. 10036, for the Johnson 1-6 located in the SE/4 SE/4 NW/4, Section 6, T16N-R8W, Mecosta County, Michigan. Please cancel this latter permit, as it is now inappropriate to drill at that location in view of this newly proposed location.

We will arrange to have J. L. Wilcox & Associates do an elevation survey within ten (10) days after spud date of the above well.

Please note that an application for an Oil & Gas Drilling Permit for this location is being submitted simultaneously with this application. It is our understanding that this drilling activity will be conducted jointly under Acts 315 and 61 as per the letter from R. Thomas Segall, Assistant Supervisor of Wells, to Mr. Donald D. Metzger, dated August 4, 1982.

While sour oil and gas zones are not expected, good drilling practices and proper fluid density will be employed and should readily control such occurrences. Procedures regarding the use of hydrogen sulfide signs, flags and wind indicators will be employed. Fresh air breathing apparatus will be available at the well site. Part 2 of the Oil & Gas Sour Gas Contingency Plan, although not required for this well, is attached for reference purposes.

It is requested that all information be kept confidential as the regulations allow.

Sincerely.

Donald D. Metzger ' VV Director, Exploration and

Michigan Operations

DDM: pka

GEOLOGICAL SURVEY

AUG 16 1982

MINERAL WELL SECTION

STATE OF MICHIGAN	1. DATE OF APPLICATION 2. FEE ENCLOSED							
DEPARTMENT OF NATURAL RESOURCES	August 13, 1982 \$1.00							
GEOLOGICAL SURVEY DIVISION	3. APPLICATION TO							
	Drill							
APPLICATION FOR A MINERAL WELL PERMIT	4. TYPE MINERAL WELL 5. WELL DESIGNATION							
To Drill, Operate, Convert, or Rework	D-5 (Test Well)		Johnson	1-6				
a Brine, Storage, Disposal, or Test Well.	6. LOCATION:	L						
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By Authority of Act 315, P. A. 1969	7. TOWNSHIP	8	, COUNTY					
By Additiontly of Act 315, 1 . A. 1909	Chippewa		Mecosta					
9. APPLICANT				10. TEL	EPHONE			
Willmet, Inc.					773-3949			
11. ADDRESS (Street, City, State)				12. ZIP (
2250 Enterprise Drive, Mt. Pleasant, I	MI 48858			4885				
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Donald W. & E. Caroline Johnson	Donald W. Johnson, e	et ux.;	carrie m.					
19. DRILLING CONTRACTOR 20. ADDRESS	C40 Mt D7	AT ACCEC		21. TEL				
	642, Mt. Pleasant, N	41 48858			773-6946			
22. TYPE DRILLING TOOLS 23. FORMATION	NC			24. INTE				
CABLE X ROTARY COMBINATION Niagaran				8,0				
25. PROJECT ENGINEER OR GEOLOGIST 26. ADDRESS W. J. Strickler (to A-1 Carbonate)				1	EPHONE			
D. Metzger, C. Jones (from A-1 to 1D) 2250 Ente	erprise Dr., Mt. Plea				773-394 <u>9</u>			
28. PROGRAM OF DRILLING, CONVERTING, REWORKING, CASING, CE (See appropriate instruction sheet. Attach 3 copies of proposed program —	MENTING, COMPLETING, OPER	RATING, AN	D MONITORING	3. In the				
Instruction sheet,)	- including but not necessarily time		nation requested	ni tile				
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29. ADDRESS CORRESPONDENCE AND PERMIT TO:				30. TEL	EPHONE			
Willmet, Inc., 2250 Enterprise Dr., Mt. Plea	asant, MI 48858				73-3949			
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MINERAL WELL SECTION USE ONLY	The Applicant agrees to		•	-				
STATUS OF BOND	of Act 315, P.A. 1969, and asserts that the information on this							
Z/AV	application and attached report is true and correct.							
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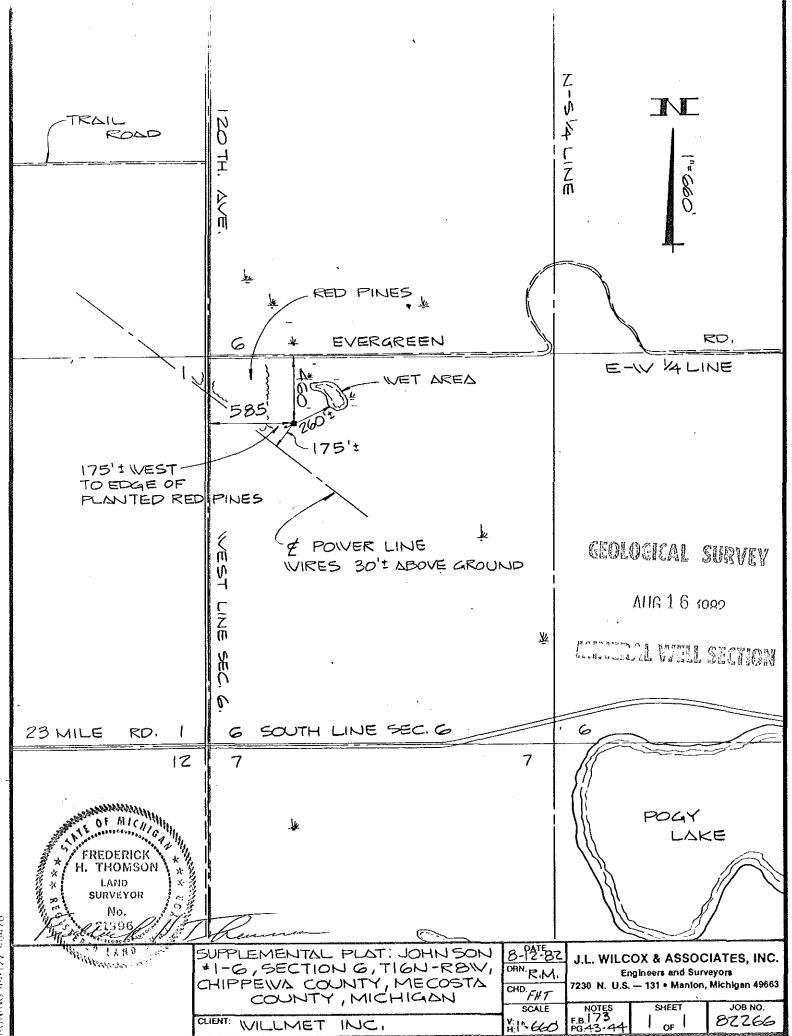
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SURVEY RECORD OF WELL LOCATION (Submit five copies with Application for Permit to Drill a Well for Oil or Gas, Brine Disposal, Hydrocarbon Storage or Secondary Recovery)

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Chippewa				<u></u>	Mecosta			
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NAME OF INDIV	IDUAL WHO SURVE	YED WELL SITE			DATE	TITL	E	==
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WILLMET, INC.

2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

August 13, 1982

Mr. Robert E. Ives Department of Natural Resources Geological Survey Division 4th Floor, Mason Building P. O. Box 30028 Lansing, MI 48909

Dear Mr. Ives:

Subject: Willmet Standard Casing and Cementing Procedures

Listed below are Willmet's standard casing and cementing procedures:

- Drive 24" conductor pipe as deep as possible. This allows us to set 20" conductor inside and lower if trouble occurs with washout under conductor pipe while drilling surface hole.
- 2. Drill 17 1/2" hole to base of drift or to a firm footing as determined by geologist from samples.
- Run 13 3/8" S.T.C. 48# Seamless H-40 casing equipped with 3. Texas pattern weld on shoe. A float collar is set 30', or one joint, off bottom. The lower 5 joints of casing are strapped across collar in either two or three sectors. Top and bottom cement plugs with no centralizer as recommended by cementing. company (see attached).
- 4. We also run a cement basket approximately 50' below surface, making sure cement is circulated back to surface.
- We then drill 12 1/4" hole 50' into Bass Islands formation or the Amherstburg if local drilling shows no lost circulation zones in the Bois Blanc and set 9 5/8" L.T.C. 40# N-80 grade pipe with a guide shoe on bottom with float collar first joint up and all bottom 6 joints secured with Weld-A or Baker Lok or some similar material.
- Centralizers are run per cementer's recommendation attached. 6.
- For both the surface and intermediate casings, the lower 7. joints of casing are roughened unless they appear rusty as this provides a much better bond for cement.

Sincerely 5 |

Donald P. Smith Exploration Engineer

GEOLOGICAL SURVEY

DPS/jlc

AUG 16 1082

Surface Casing (13 3/8" in $17\frac{1}{2}$ " hole 0 750 ft.

- .A. Use insert float and Texas Pattern Shoe and lock to shoe joint with thread lock.
 - B. No centralizers
 - C. Circulate hole a minimum of one complete circulation
 - D. Do not reciprocate casing
 - E. Run bottom (red) wiper plug.

Do not use if carry LCM in cement

- F. Pump 70 bbls fresh water ahead of cement
- G. Cement with:
 - 1. 475 sx 50/50 Poz, 6% total Gel, 3% CaCl₂ 1.54ft³/sk, 13.3#/gal, 7.66 gals/sk
 - 2. 200 sx Class "A", 3% $CaCl_2$ 1.18 ft³/sk, 15.6#/gal, 7.66 gals/sk

Intermediate Casing: (9 5/8 in 12% hole @ 5100 ft)

Recommended Procedure:

- A. Use float collar and guide shoe and lock to shoe joint with Halliburton Weld-A
- B. Run one centralizer 10' above guide shoe and four more at every other collar spacing.
- other collar spacing.

 C. Circulate hole a minimum of one complete circulation and until the drag stabilizes.
- D. Reciprocate casing while circulating and cementing. Stop reciprocation just prior to bumping top plug.
- E. Run bottom (red) wiper plug.

Do not use if carrying LCM in cement.

F. Pump 30 bbls fresh water ahead of cement.

G. Cement with:

1. 150 sx Special Cement

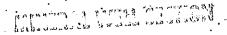
NOTE: State requires 500 of annulus fillup and a minimum of 150 sx for intermediate casing.

- H. Run top (black) wiper plug.
- I. Displace with fresh water.

Casing Equipment: (9 5/8)

Regular Guide Shoe Float Collar with Auto Fill Halliburton Weld-A (2) Centralizers (5) GEOLOGICAL : SHRVEY.

AHR 16 1000



2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

August 13, 1982

Mr. Robert E. Ives Department of Natural Resources Geological Survey Division 4th Floor, Mason Building P. O. Box 30028 Lansing, MI 48909

Dear Mr. Ives:

Subject: Willmet Testing Program

The test well covered by this application is being drilled into the top of the Niagaran formation to approximately 8,000'. The primary objective is evaluation of the potash mineralization of the A-1 Evaporite, which occurred in the interval -7,579' to -7,931' in the Freudenburg 1-31 well located in the SE/4 NE/4 NE/4 of Section 31, T17N, R8W, Osceola County, Michigan.

The testing program will consist of cutting 4" cores through the anticipated potash mineralized section. Then gamma ray, neutron and other geophysical logs will be run at total depth.

Geophysical logs will also be run from the base of the surface casing to total depth. Sample cuttings will be retained and sample descriptions will be submitted with the plugging record. Hydrocarbon shows will be drill stem tested.

Sincerely, Lonald D. Metzgerfe

Donald D. Metzger Director, Exploration

& Michigan Operations

DDM/jlc

2250 ENTERPRISE DRIVE • MOUNT PLEASANT, MICHIGAN 48858 517 • 773 • 3949

August 13, 1982

Mr. Robert E. Ives
Department of Natural Resources
Geological Survey Division
4th Floor, Mason Building
P. O. Box 30028
Lansing, Michigan 48909

Dear Mr. Ives:

Subject: Casing Removal and Plugging

Upon completion of the coring and logging of the test well covered by attached permit application the well will be abandoned and plugged as follows:

- 1. Removal of well head used for drilling.
- 2. Weld on to existing intermediate casing string.
- 3. Run "free point" to determine amount of casing which can easily be recovered above the top of cement.
- 4. Run explosive type casing cutter and cut casing.
- 5. Lay down recovered casing and proceed to plug hole.

Plugging will consist of running open end drill pipe to T.D. and setting continuous cement plugs to surface. The casing will be cut off at least 3 feet below surface and a 1/2" steel plate welded over the top of surface casing stub.

The wooden cellar will be removed and backfilled according to D.N.R. specifications.

Sincerely,

Donald P. Smith Exploration Engineer

DPS/jlc

•			

d. Johnson 2-1, Permit #00377



EPARTMENT REPRESENTATIVE

AMENDED 1-4-88

DATE

		AL WELL PLUG ATE Within 30 Days A	==:		d		DATE 5-29-84				
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OPERATORS USE DEPARTMENT USE ONLY Supplemental Plugging Data and Site Conditions:

MINERAL WELL PLUGGING RECORD

File in DUPLICATE Within 30 Days After Plugging is Completed

DEPARTMENT RIPRESENTATIVE

AMENDED 1-4-88
PERMIT NUMBER

DATE

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OPERATORS USE
DEPARTMENT USE ONLY
upplemental Plugging Data and Site Conditions:
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CEOLOGICAL SECTOR

STATE OF MICHIGAN

377-854-74

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Permittee Orig. & 1 copy	QU.T	4	3 1985
Division Office 2 copies		i	

DEPARTMENT OF NATURAL RESOURCES GEOLOGICAL SURVEY DIVISION

SECTION

PERMIT NUMBER	
MW012-341-354	

FIELD NAME

Hersey

COUNTY

Gardroi PERMIT TO PLUG AND ABANDON

Others - On request Regulator NAME AND ADDRESS OF PERMITTEE

PPG 0il & Gas

LEASE NAME AND WELL NO

Field Office - File copy

Johnson #2-1

LOCATION (1/4 1/4 1/4 or other)

NW SE NE.

1 DATE COMPLETED

т 16N в 9W

Grant DATE PLUGGING WILL START

Mecosta

TYPE OF WELL (Oil Gas. Ory Hole etc.) Min. well

4/26/84

a.s.a.p.

D. Smith

PLUGGING PERMIT REQUESTED BY & DATE

LAST PRODUCTION

8WPD

MOEGED

DATE

PLUGGING TO BE DONE BY

TOWNSHIP

Lease Mgmt.

PERMIT MAILED TO

BOPD

COPIES MAILED TO

CASING AND CEMENTING RECORD

HOLE DIA.	CASING DIA. & WT./FT.	DEPTHS SET	CEMENT QUANTITY, TYPE, ADDITIVES	CMT. TOP.	PERFORATIONS
	13-3/8"	, 905	700	surí	
	9-5/8"	5507	2100	surf	
	7"	7829	1200	surf	
			4304.99		

GEOLOGIC DATA; GAS AND OIL SHOWS; DRILLING AND COMPLETION DATA:

PLUGGING REQUIREMENTS'

Plugging requirements outlined are to be executed in accordance with the provisions of Act 61, P.A. 1939, as amended, and rules and orders adopted thereunder

(Previously PB to 7783') run tubg. to 7783': spot 700 sx lite cmt. and 93 sx Cl A cmt. Cut csg off 3' below grd & cap w/ cmt. & steel plate.

NOTIFY CADILLAC OFFICE 48 HOURS PRIOR TO PLUGGING.

"NOTE. BONDS CANNOT BE RELEASED UNTIL A PLUGGING IS COMPLETED, CELLAR RAT HOLE AND PITS FILLED, WELL SITE RESTORED AND RECORDS FILED. WATER WELLS MUST BE PLUGGED ACCORDING TO RULE 166 OF ACT 294 P.A. 1965, "GROUND WATER QUALITY CONTROL", It is further made a requirement of this permit that the applicant give notice to the public utilities in accordance with Act 53, P.A. 1974 C.L. 460.701 to 460.718 and comply with each of the requirements of the act.

AUTHORIZED BY (signature)

OFFICE

Cadillac D#6

DATE 9/19/85

MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315 P.A. 1969)

SUBMIT IN TRIPLICATE

																1_	
NAME OF OWNER OR OPERATOR							ADDRESS OF OWNER OR OPERATOR										
PPG Oil & Gas Co., Inc.							2258 Enterprise Drive Mt. Pleasant, MI 48858										
NAME OF I	NAME OF DRILLING CONTRACTOR						ADDRE	\$\$	OF DRILLIN	G CONTRA	ACTOR	₹			<u> </u>		
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WELL NAM	IE		****						WELL N	-	MBER	PERMIT I					
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SIGNATUR	F ,							TITLE	•		<u> </u>				DATE		
14)			مح	L	Book.			Geologist 5/29/84									
						<u> </u>											

GIVE COMPLETE FORMATION RECORD ON REVERSE SIDE



PPG Industries, Inc. One PPG Place Pittsburgh, Pennsylvania 15272

May 15, 1984

Michigan Department of Natural Resources Stevens T. Mason Building P.O. Box 30028 Lansing, MI 48909

ATTENTION: A. J. Rarick

Dear Mr. Rarick:

Enclosed please find an original and two copies of our Application for a Mineral Well Permit relating to the conversion of the Johnson #2-1 well to a solution mining well. Also enclosed is a check for the fee in the amount of \$50.00.

If you require any additional information, please contact me at (412) 434-3907.

Sincerely,

Joseph Gil, Jr.

Losyl fie h

JG:rm Enclosures

cc: (w/enclosures)

D. D. Metzger

G. F. Pellett

R. J. Samelson

L. H. Wilcox

RES 969.0

STATE OF MICHIGAN		1. DATE OF APPLICATION	OSED	D .					
DEPARTMENT OF NATURAL RESOURCE	s	May 16, 1984		\$50.00					
GEOLOGICAL SURVEY DIVISION		3. APPLICATION TO							
		Convert to Solu	tion Mini	ng					
APPLICATION FOR A MINERAL WELL	PERMIT	4 TYPE MINERAL WELL 5. WELL DESIGNATION							
To Drill, Operate, Convert, or Rework a Brine, Storage, Disposal, or Test Well		Solution Mining		Johnso	on 2-1	·····			
D. A. J. V. CA (015 D. A. 1000		NW/4 of the SE/4	of the NE	% SEC	<u> </u>	16N F	R 9W		
By Authority of Act 315, P. A. 1969		Grant		Mecost	ta				
9 APPLICANT		I di dit		FIECUS		O.TELE	PHONE		
PPG Industries, Inc.					,		34 - 3907		
11 ADDRESS (Street, City State)						2 ZIP C			
One PPG Place, Pittsburgh, PA					1	152			
13 SURETY OR SECURITY COMPANY		14. TYPE		15 AMOUNT	г 1	6 BONE			
Hartford Accident & Indemnity Co.		SINGLE	BLANKET	\$25,000	1	45062			
17 OWNER OR SURFACE RIGHTS		18 OWNER OR MINERAL	DIGUTE	\$25,000	.00	43002	<u> </u>		
Donald and E. Caroline Johnson		Gerald Knapp, e							
19 DRILLING CONTRACTOR	20 ADDRESS	dera la kliapp, e	ιαι		12	1 TELE	PHONE		
T. D. Provins		642, Mt. Pleasant	, MI 488	ES	1.		73-6946		
22 TYPE DRILLING TOOLS	23 FORMATIC		Pil 400	170		A INTE	NOSD		
CABLE X HOTARY COMBINATION	Niagaran	714			1	DEPT	H8000'		
25 PROJECT ENGINEER OR GEOLOGIST	26 ADDRESS				7	7. TELE	OUUU		
Donald D. Metzger	1	namaica Dadus Mt	0100000+	MT ZOO	1.		73-3949		
28 PROGRAM OF DRILLING CONVERTING REWORKI		erprise Drive, Mt.				317] [/3-3745		
(See appropriate instruction sheet Attach 3 copies of principles of prin	oposed program –	- including but not necessarily	limited to info	ormation reques	sted in the	e			
CASING PROGRAM:			<u> </u>	INSTRUC	TIONSH	EET NO			
Size Depth Cement			Туре	of Well	Drill-Ne	w	Rework*		
			Brìne		D-1		A-1		
			Stora	ge	D-2		R-1		
See Attached			Dispo	sal	D-3		R-1		
			Solut	ion Mining	D-4		R-2 X		
			Test \	Weli	D-5		R-1		
			*Rew	ork, Deepen, o	r Convert	to New	Use		
THERE WILL BE NO CHANGES IN THE SUPERVISOR OF		OUTLINED IN THIS APPLICA LLS C.4 HIS AUTHORIZED R			AL OF				
29 ADDRESS CORRESPONDENCE AND PERMIT TO:			•		3	O TELE	PHONE		
PPG Industries, Inc., One PPG Place	<u>e, Pittsbur</u>	gh, PA 15272 /	<u>ATTENTION</u>	: J. Gil	Jn.(412)4	34-390		
MINERAL WELL SECTION USE ONLY	(The Applicant agrees to comply with provisions and requirements of Act 315, P.A. 1969, and asserts that the information on this							
Eddet		application and attacl	ned report is	true and co	rrect.				
APPLICATION APPROVED BY									
afranch		SIGNATURE (APPLICANT)	AUTHORIZE	D REP.)	-	ATE	,		
377 010 -845-73	7	toseth be	h			2/16/	84		
DATE ISSUED 5/31/84		NAME(TYPED) Joseph Gil, Jr	•						
ISSUED BY Apranich		TITLE Project Managei	r						
DISTRIBUTION:		FOR CASHIER'S USE ONL				R 7500	2/73		
White — Lansing Canangt Field 6924 Pink — Applicant									

SURVEY RECORD OF WELL LOCATION

(Submit five copies with Application for Permit to Drill a Well for Oil or Gas, Brine Disposal, Hydrocarbon Storage or Secondary Recovery)

84024 LESSEE (OWNER OF LEASE RIGHTS) PPG INDUSTRIES, INC. LESSOR (OWNER OF MINERAL RIGHTS) WELL NO. (Johnson #2-1) 2-1 LOCATION NE FRC'L SE т. 16 N n. 9 W % OF 1/4 SECTION 1 14 OF COUNTY TOWNSHIP Mecosta Grant 1. Outline drilling unit and spot well location on plat PLAT BELOW REPRESENTS ONE FULL SECTION at left. Where drilling unit crosses section lines, N (1 Mile Square) divide the plat into an east half and a west half OR a north half and a south half (which ever applies). BOTTOM -Outline the unit and locate the well in two 611' HOLE directions from NEAREST quarter section and unit 2. Location of well in two directions from NEAREST 1267" quarter section and unit lines is: SURFACE LOCATION SURFACE 1077 ft. from South line of Quarter Section LOCATION 1077 1267 ft. from East _ line of Quarter Section __ft. from ____ line of unit line of unit _ ft. from __ SECTION 3. Describe wellsite marker. Show or describe access route if it is not readily accessible.

Wellsite is marked with an existing casing. Site can be reached from the North off Balsam Road. See supplemental plat.

Ground elev. = 1156.4 feet, U.S.G.S. datum.

4. ON SEPARATE PLAT OR PLOT PLAN:

(Scale of Plat - 1 inch equals 1320 ft.)

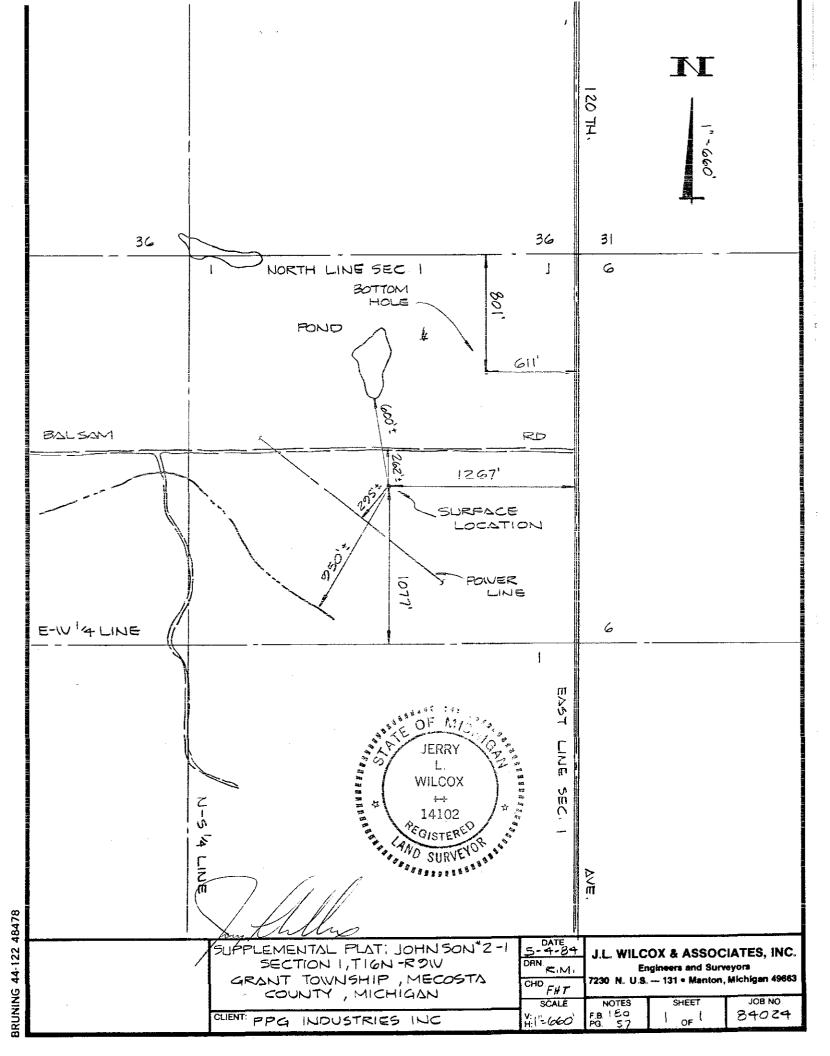
A. Locate, identify, and show distances to all roads, power lines, residences buildings, and other structures within 300 feet of the stake;

B. Locate, identify, and show distances to all lakes, streams, swamps, drainage-ways of any other surface water features within 1320 feet of the stake.

5. In an ENVIRONMENTAL IMPACT ASSESSMENT describe all structures and detailing plans for hazards prevention and erosion control (See instructions productions and elines for breparation of an environmental impact assessment). preparation of an environmental impact assessment).

i		<i>/</i>			9 //								
ΝĄΙ	ME ØF	IND	IVIDUAL V	νμίο	SURVEYED WEL	LSITE			DATE		TITLE		
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A DA	DRESS	,											
	J.	L.	WILCOX	&	ASSOCIATES,	INC.	7230	North	U.S131	Manton,	Michigan	49663	
	LOF	\T.	737 TILE 4		4- 41150014ATI			110 400	NING STEE TO	THE DEAT OF	AND IZACONALI E	TOOK AND DELLES	

I CERTIFY THE ABOVE INFORMATION IS COMPLETE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF DATE (MONTH, DAY, YEAR)



Section 28 - Solution Mining Well Program

I. Drilling and Completion Programs

The Johnson 2-1 was drilled and cased according to the following:

A. Surface

- 1. The 24" conductor pipe was driven to a depth of 96.5'.
- 2. A 17-1/2" hole was drilled to a depth of 905'.
- 3. Then 13-3/8" 54.0# K-55 S.T.C. was run to total depth. A weld-on guide shoe was placed on bottom and the lower five joints were strapped across the collars.
- 4. Surface casing was cemented with 525 sacks HOWCO lite and 200 sacks Class A cement. Seventy barrels of cement were returned to surface on the outside of the casing.
- 5. Blowout preventor equipment was installed on 13-3/8" casing and the equipment was pressure tested to 1500 psi for 15 minutes.

B. Intermediate Hole

- 1. A vertical 12-1/4" hole was drilled from below the surface casing to 4240'.
- 2. The hole was then directionally drilled NE of the surface location to a depth of 5545' measured depth (MD) with an angle of $22-1/4^\circ$ N37E at 5456' MD.
- 3. The 9-5/8" 40# N-80 L.T.C. casing was then run using a float shoe on the bottom and a float collar at the top of the first joint with 7 centralizers installed midway on every second joint. The centralizers were held in place with stop rings. A D.V. tool was installed in the casing string approximately 3710' from the surface.
- 4. The 9-5/8" casing was cemented to the surface. The first stage was cemented with 700 sacks HOWCO lite with 2% CaCl and 200 sacks Common Class A. The D.V. tool was then closed and the second stage was cemented using 1100 sacks HOWCO lite with 2% CaCl and 100 sacks Common Class A with 2% CaCl.
- 5. Twenty barrels of cement were returned on the first stage. Forty barrels of cement were returned on the second stage.

C. Production Casing

- 1. The blowout preventor equipment (BOPE) was installed on the 9-5/8" casing and was tested to 1500 psi for 15 minutes using the rig pump.
- 2. The D.V. tool was drilled out along with the float collar and the float shoe. The drilling of an 8-1/2" hole commenced from below intermediate casing.

- 3. The hole was drilled using the build and drop method, with the angle of the hole being back to vertical at approximately 7765'. The maximum angle achieved was 24-1/2°.
- 4. The hole was cored through the zone of potash mineralization.
- 5. Drilling continued to a total depth of 8082', ten feet into the Niagaran formation.
- 6. Geophysical logs and a gyro survey were run.
- 7. The hole was plugged back from total depth to approximately 7850' with 50 sacks of HOWCO lite.
- 8. Seven inch 23# S-95 L.T.C. casing was run with a float shoe and centralizer on the bottom. A float collar with manual fill was run one joint up with the centralizers midway between joints and held in place with a stop ring.
- 9. Two more joints were run and a short marker pup was installed in the production string.
- 10. Casing was run continuously to surface.
- 11. The casing was cemented with 475 sacks HOWCO lite A, salt saturated with 1/4# per sack D-Air-1, 450 sacks HOWCO poz 18% salt and 1/4# per sack D-Air-1, and 280 sacks HOWCO special H with .2% HR-7.
- 12. Forty barrels of cement were returned to surface around the outside of the pipe.
- 13. The casing was landed in slips at 7838' and capped with a temporary blank pending approval of the application for a permit to convert the well to a solution mining well.

D. Geophysical Logging

In addition to the logs run at intermediate casing point, gamma ray, neutron and other lithology indicating logs are run from the base of the intermediate casing to the top of the Niagaran formation. Later, when the cement plugs are drilled out to below the zone of mineralization, a series of cased hole-logs will be run. A cement bond log and collar locator will be run from total depth to surface. The depth of the casing is checked using a collar locator log to locate the marker joint.

E. Tests

The pressure testing of the 7" casing to 80% of burst pressure will take place prior to the initial mining. This pressure exceeds 133% of operating pressure. A packer will run to the bottom and the pressure checked in the final stages before mining commences.

F. Mining Interval

Mining will be commenced in the salt a short distance above the bottom of the 7" casing. The exact depth depends on the depth at which the potash bed is encountered in the Johnson 3-1. Mining will be continued up through the salt and potash sections to a height up to approximately 6458' to 6428', subsea.

G. Well Area

The well head will be surrounded by a concrete and steel sump. This sump will drain by gravity through a pipeline into a sump within the test mining facility processing building, where any leakage will be captured by a sump pump and reinjected into the circulating fluid system.

II. Operation

A. Solutioning System

- 1. Single Well Operation
 - a) The well will be initially operated as a single well with annulus injection and tubing withdrawal. Oil will be used as the inert padding system for roof control in the cavern. Oil will be added to the well on a batch basis as required. The well will be operated as a single well until the cavity size is large enough to connect with an adjacent cavity (Johnson 3-1). It will then be operated in multi-well operation.

2. Multi-Well Operation

a) After connection has been established the well will be operated as a two well gallery. Each well may be operated as an injection or withdrawal well in the multi-well mode. Oil padding will continue to be used for roof control throughout the multi-well phase. The well will be operated in the multi-well mode until sufficient data have been collected from the test. It is anticipated that this phase of the operation will take between 160 and 200 days to complete.

B. Operating Parameters

- Average injection flow will range from 50 gpm to 390 gpm with short-term peak flow to 600 gpm.
- 2. Withdrawal flow will be approximately 97% of injection. No losses are anticipated to the formation.
- 3. Injection temperature will range from 50°F to 180°F.
- 4. Injection pressure will depend on the injection flowrate and the density difference of the injection and withdrawal fluids. It is anticipated that the injection pressure will range between 900 and 1300 psig.
- 5. Specific gravity of the withdrawal fluid will range between 1.0 (water) and 1.25.
- 6. Chemical composition of the withdrawal fluid will depend on the ore being dissolved and is anticipated to range from nearly pure water to an aqueous solution of sodium chloride (NaCl) and potassium chloride (KCl) containing up to 435 gpl combined dissolved NaCl and KCl.

7. The only pre-treatment of the injection fluid (water) will be heating of the water to 180°F during certain stages of the solution mining test. Chemical pre-treatment is not required.

III. Monitoring

A. Operating Parameters

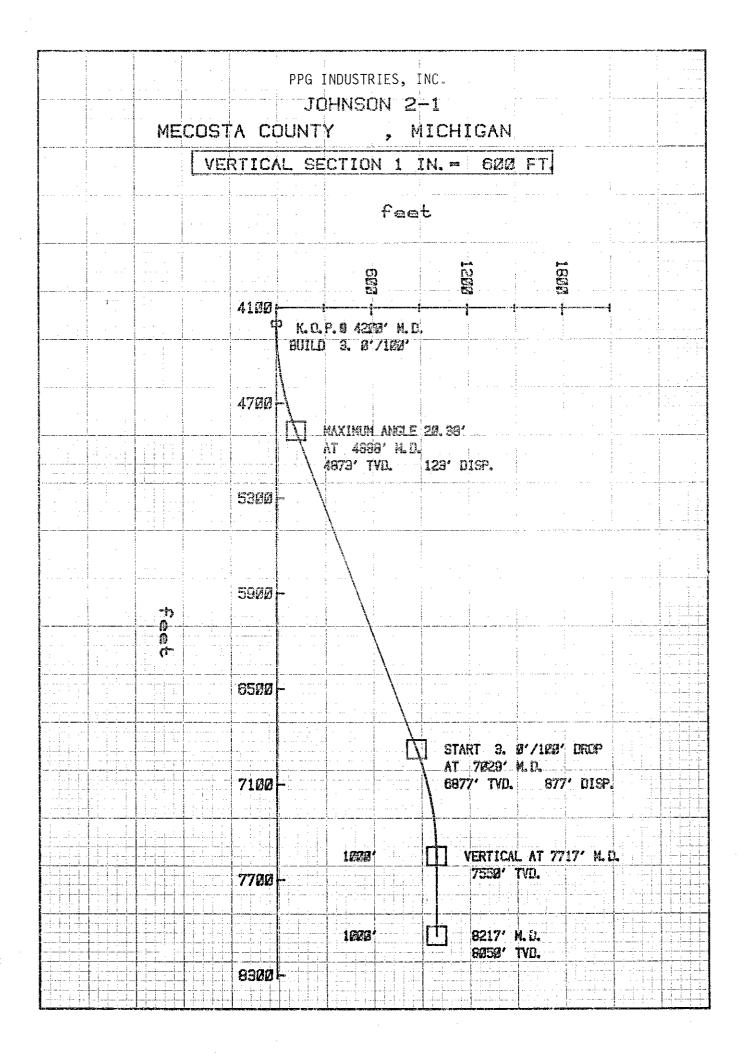
The injection and withdrawal flowrate for the well(s) will be monitored by totalizing flowmeters. Flow information along with the chemical analysis of injection and withdrawal as determined from daily composite samples will be used to perform daily material balances on the solution mining process. The material balances will provide a daily accounting of the KCl and NaCl withdrawn from the well(s).

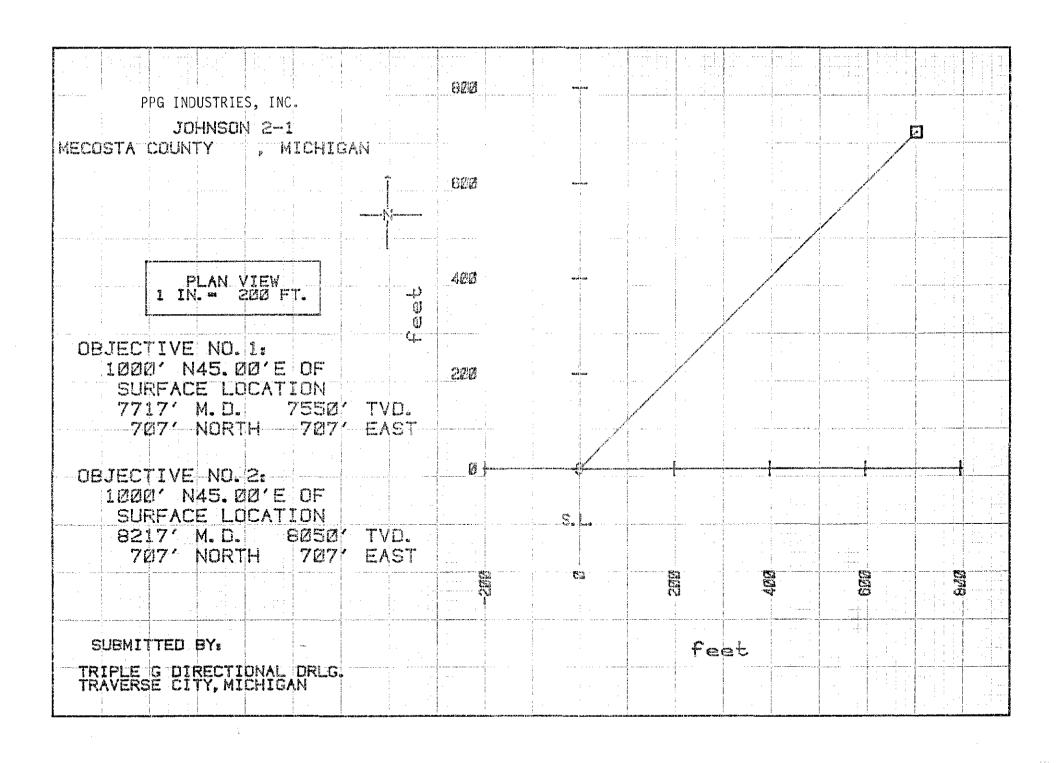
B. Well Integrity and Solutioning Process

- 1. The well head and surface equipment will be visually monitored by operators who will be on duty 24 hours per day, seven days per week, throughout the test.
- 2. The condition of the borehole, casing, and cement sheath will be determined by monitoring the pressure when the well is operating. If any loss of fluid (other than expansion of the cavity) is indicated from a comparison of the injection and withdrawal flowmeters, pressure and/or video testing of the casing will be performed to locate leaks.

C. Surface Changes

In order to monitor any ground surface movement at the well area, two bench marks will be established on the site. These bench marks will be located at least 200 feet away from the area in which the cavity will be formed. The bench marks will be a precast concrete monument approximately 4 inches in diameter and 3 to 4 feet long having a 1/2 inch diameter reinforcing rod embedded in the center. The monument will be buried in the ground vertically having one end exposed. A monument grid will be utilized. The grid will be made up of four additional bench marks which will be placed over the cavity. A survey of second order accuracy will be conducted to determine the elevation of the monuments in the grid relative to the bench marks. These will be measured annually and reported to DNR every two years.





the applicant to allow all-weather operation. The environmental effect of this project is slight, and every effort will be made to insure protection and preservation of the environment during the course of operations.

Applicant's Representative

					tosyl fieh
Comments	Ьy	Department	of	Natural	Resources Representative:
					Authorized Representative

PPG Oil & Gas Co., Inc.

A Subsidiary of PPG Industries, Inc.

2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949



June 26, 1984

Supervisor of Mineral Wells Geological Survey Division Department of Natural Resources P.O. Box 30028 Lansing, MI 48909

Re: Johnson 2-1 Reports and Logs

Gentlemen:

Enclosed are the following reports and logs for the Johnson 2-1:

Form R7506-1, Mineral Well Plugging Record - 2 copies Form R7504, Mineral Well Completion Report - 3 copies Sample Descriptions - 2 copies Final Logs:

Dual Laterolog/Micro SFL/GL Compensated Neutron-Litho Density, Run 1 & 2 Directional Survey

Upon receipt, please sign below and return one copy to our office.

Sincerely,

GEOLOGICAL SURVEY Janet Caltrider
111N281984

∥Janet Caltrider

Janet Caltrider
Operations Staff Assistant

JC/11h **Enclosures**

Received on 19/29/84, by 1984, by 18 Amarile

TRIPLE-G REPORT of SUB-SURFACE DIRECTIONAL SURVEY

GEOLOGICAL SURVEY

100 8 1984

PPG 0il & Gas Company, Inc.

CALLED SECTION

Johnson #2-1 WELL NAME

<u>Mecosta County, Michigan</u>

JOB NUMBER

TYPE OF SURVEY

DATE

TC-MJ-40052

Gyroscopic & Single Shot Survey

04/23/84

SURVEY BY Burdick

OFFICE Michigan

RECORD OF SURVEY

Triple "G' Directional Drillins, Inc. Objective N45,80E

JOB NO. 40062 DATE 4/23/84

Checked by

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SURVEY RECCRO 印刷

Triple 'G', Directional Drilling, Inc. Objective N45.80E

JDB NO. 40032

DATE 4/23/64

Checked by

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RECORD

Triple 'G', Directional Drilling, Inc. Objective N45.00E

JOB NO. 40062

DATE 4/23/84

Checked by

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BOTTOM HOLE CLOSURE - 1006.20 FT. at N 40 DEG. 42 MIN. E

METHOD OF COMPUTATION - RADIUS OF CURVATURE

e. Johnson 3-1, Permit #00337



MINERAL WELL PLUGGING RECORD 5

27-88

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	4-84	7-5-				D BEFORE			YES	□ NO
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CASING SIZE	WHERESET	AMOUNT RECOVERED	SHOT OR		TYP	E OF BRIDG	ES OR PLU	G\$	DEPTH	NUMBER
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9 5/8	5575	None		C	ement				7823	365 sx
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ere tools tu	bing casing, etc.,	lost or left				If yes, give	e detail s	mits & Bo		
the hole bet	fore or during plu	igging?	YE	S xx	NO		1 61	iiiig & B0	nding Ur	1[‡
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id a Service (Company pump r	mud.				If yes, give	e name and	address:		
oot cement. o	or set bridge plug:	s?	KX YE	s L	_} ио					· · · · · · · · · · · · · · · · · · ·
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Do	nald D. Me	etzger	·	_ of		um Chem	icals		<u>. </u>	(company):
		aid Owner or Oper are true, correct :					. was prepai	ed under my	supervision	and direction
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(Janox E.	VVI exize	11126	140th	a Ave,	Hersey	, MI	Residen	t Manag	er
		- 1/4	FI	NAL IN	SPECTIC	NS			T	
EPARTMENT	REPRESENTATIV	/E							DATE	
EPARTMENT	RIPRESENTATIV	/E						: ;	DATE	

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

	PERMIT NUMBER
	MW337-844-754
	FIELD NAME
	Hersey
_	

,0,					FIELD	Hersey	
COMPLETE NAM	E(S) AND ADDRES	S OF WELL OWNER	3			iei sey	
				se Drive, Mt.	Pleasant	, MI 48858	
	se or farm nam nson 3-1	E(S)					WELL NUMBER 3-1
WELL LOCATION	SE NE	% SEC. 1	т. 1	6N R. 9W	Towns: Gran		COUNTY Mecosta
	oil Gas, Dry Hole. eral weld	etc.)		TOTAL DEPTH	FORMA		
DATE PLUGGING		DATE PLUGGING		DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT 文文 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			T OR XXXXXXXXXX
	CASING	RECORD		7	Ř	RIDGES OR PLUG	S
SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED	TYPE (Bru Cement Mech	sh, Stone,	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
13 3/8"	905'						
9 5/8"	55751						
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	ng, casing, etc., lo re or during plugo		☐YES 🗓	If yes,]NO	give details:		
	mpany pump mu set bridge plugs?	ıd,	X YES	_	give name an lliburton	d address;	
	gged by a Compa r than Owner or t		YES X	If yes,	give name an	d address:	
Representatives plugging:	of Owner, Opera	tor, Company, or C	Contractor who	witnessed <u>Sli</u> j	n Cooking	nam	
- 20 3							
-Plugged or	7-6-84 par n 9-11-85 as	tially as fo	HOWCO Lit	sx @ 8118', 30 e, spot 175 s	acks, pluq	gs 0 5411', 2891',	@ 6000' 4571', 3731', 2051'
			HOWCO Lit Common	e, 130 s: 110 s:			
Cut off 9	5/8" wellhe	ad 3' below o	round and		sing.	. vv	
						No.	···
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			ator to make th			s prepared under	my supervision and direc
		<u> </u>	ct and complete	to the best of my k		NIAME AND ADD	oree
Donald P.	E (Typed or Printed Smith	a)				NAME AND ADDE	
SIGNATURE	जाम हो।	· · · · · · · · · · · · · · · · · · ·	DAT	E (Month, Day, Year)	1	l & Gas Co., nterprise Dr	
° ≽-		Ī		Q -74-05	- Mt. Ple	easant, MI 4	8858

GEOLOGICAL SHIPE!

DNR DISTRIBUTION

STATE OF MICHIGAN

SEP 2 1981 DEPARTMENT OF NATURAL RESOURCES

1	PERMIT NUMBER
	MW337-844-754
- 1	

Permittee — Orig. & 1 copy	GEOL	OGICAL SURVEY DIVISION	MW.	MW337-844-754		
Division Office — 2 copies Field Office — File copy Others — On request Regulator	y Contr RERMIT TO	PLUG AND ABAN	IDON FIELD	NAME Hersey		
NAME AND ADDRESS OF PERMITTEE PPG 0:11 & Gas						
lease name and well no Johnson #3–1						
LOCATION (1/4 1/4 1/4 or other)	SECTIO	1-1	TOWNSHIP	COUNTY		
NW SE NE,	1	т 16Na 9W	Grant	Mecosta		
TYPE OF WELL (Oil Gas, Dry Hole etc.)	DATE COMPLETED	DATE PLUGGING WILL START	PLUGGING PERMIT REQUES	STED BY & DATE		
Mineral well		a.s.a.p.	Don Smith			
LAST PRODUCTION		······································	PLUGGING TO BE DONE BY	*		
BOPD BWPD	MCFGPD	DATE	Lease Mgmt.			

PERMIT MAILED TO COPIES MAILED TO

	CASING AND CEMENTING RECORD									
HOLE DIA.	CASING DIA. & WTJFT.	DEPTHS SET	CEMENT QUANTITY, TYPE, ADDITIVES	СМТ. ТОР.	PERFORATIONS					
	13-3/8"	905								
	9-5/8''	5575'	2,000 sx 2-stage	circl						
			W							

GEOLOGIC DATA; GAS AND OIL SHOWS; DRILLING AND COMPLETION DATA:

T.D. 8118' (hole size 8½")

PLUGGING REQUIREMENTS*

Plugging requirements outlined are to be executed in accordance with the provisions of Act 61, P.A. 1939, as amended, and rules and orders adopted thereunder

(Previously PB 8118-5475 with 665 sx cmt.)
Run tubg. to 5475'.
Spot 900 sx lite cmt. and 220 sx Cl A cmt.
Cut csg. 3' below grd. & cap w/cmt & steel plate.

NOTIFY CADILLAC OFFICE 48 HOURS PRIOR TO PLUGGING.

"NOTE. BONDS CANNOT BE RELEASED UNTIL A PLUGGING IS COMPLETED, CELLAR RAT HOLE AND PITS FILLED, WELL SITE RESTORED AND RECORDS FILED. WATER WELLS MUST BE PLUGGED ACCORDING TO RULE 166 OF ACT 294 P.A. 1965, "GROUND WATER QUALITY CONTROL". It is further made a requirement of this permit that the applicant give notice to the public utilities in accordance with Act 53, P.A. 1974 C.L. 460.701 to 460.718 and comply with each of the requirements of the act.

AUTHORIZED BY (signature)	OFFICE	DATE
		I DATE
	Cadillac D#6	0/10/05
1/11. Ital X II. Vilado	l caditiac D#O	9/19/85
		-,,
* *************************************		



PPG Industries, Inc. 2258 Enterprise Drive Mt. Pleasant, Michigan 48858 (517) 773-3949

September 26, 1985

Mineral Well Supervisor Geological Survey Division Michigan Department of Natural Resources P. O. Box 30028 Lansing, MI 48909

Gentlemen:

Enclosed is the Well Plugging Record, Form 7213 for the Johnson 1-1, 2-1 and 3-1.

Upon receipt, please sign below and return one copy to our office. Should you have any questions, or if I can be of asistance, please feel free to contact me.

Sincerely,

Janet Caltrider

Operations Staff Assistant Enclosure

70 , 1985, by

MINERAL WELL PLUGGING RECORD

PERMI	TNUMBER	
	377-844-754	
DATE	····	

	File in DUPLICA	TE Within 30 Days A		3//-844-/54					
TEMPORARILY ABANDONED							7/3	0/84	
OWNER OR OF									
	il & Gas Co.	, Inc.							
ADDRESS 2258	Enterprise D	orive, Mt. P1	leasant, MI	488	58				
WELL NAME							WELL NUMBER		
Johns							3-1		
WELL LOCATI		ME 1/ OF O	, 1 -	1.61	NT D	9W	TOWNSHIP Grant	COUNTY	- 2
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9 3/6		None			Cemen			6000	200 sx
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Ran d	rill pipe op	en ended to	8118' and s	<u> </u>	<u>ea 100</u>	sx, pu.	11ed drill pipe	0 7023	
and s	ported 360 s	ex, pulled dr	rill pipe to	3 600	<u>o and</u>	sported	ZUU SX.		
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							(U	ISE REVERSE SIDE	IF NEEDED)
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	bing casing, etc.,			-	 1	If yes, gi	ive details:		
in the hole bet	fore or during plu	gging?	L YES	S X	X NO		<u> </u>		
119									
Did a Service (Company pump m	oud				if yes ai	ive name and address:		
	or set bridge plugs		XX YES	з Г	ON [burton		
	or our strage prage	<u> </u>	<u> </u>						
Was the well p	olugged by a Comp	oany or		_	_	If yes, gi	ive name and address:		
Contractor otl	her than Owner or	Operator?	YES	S 🛚	ON K				
Rankacantativae	of Owner Operator	. Company . or Contr	rantar who witness	nd plugg	ina				
representatives	Of Owner Operator			ia piaggi	iiig				
•••		Marvin Wood		CERTI	FICATE	<u> </u>			
. Willi	lam E. Booker	r	`	of St	rick1e	r Geolo	gical Services,	Inc.	company),
' /							rt was prepared under r	•	
and that the fa		are true, correct a							
SIGNATURE	2	70 .	ADDRESS				TITLE	1	
will	een C.	Sosker.	1425 S. M				int, MI Geol	logist	
DEBA DEMENT	DEDDECENTATIV	<u> </u>	FIN	AL IN	SPECTIO)NS		- L BATE	
JEFARIMENT	REPRESENTATIV	F						DATE	
DEPARTMENT	REPRESENTATIVE							DATE	

OPERATORS USE

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	DEPARTMENT USE ONLY	
Supplemental Plugging Data and Site Conditions:		
		-
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MINERAL WELL COMPLETION REPORT TO BE FILED WITH THE SUPERVISOR WITHIN 60 DAYS AFTER COMPLETION OF WELL (ACT 315 PA 1969)

SUBMIT IN TRIPLICATE

NAME OF C	OWNER O	R OP	'ERATOR		,				ADDRE	SS	OF OWNER	OR O	PERAT	OR				
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SIGNATURE			-					TITLE								DATE		
We	elin		٤. آ	2	ank	e			Geolog	gis	st					7/30)/8	4

GIVE COMPLETE FORMATION RECORD ON REVERSE SIDE

SURVEY RECORD OF WELL LOCATION

(Submit five copies with Application for Permit to Drill a Well for Oil or Gas, Brine Disposal, Hydrocarbon Storage or Secondary Recovery)

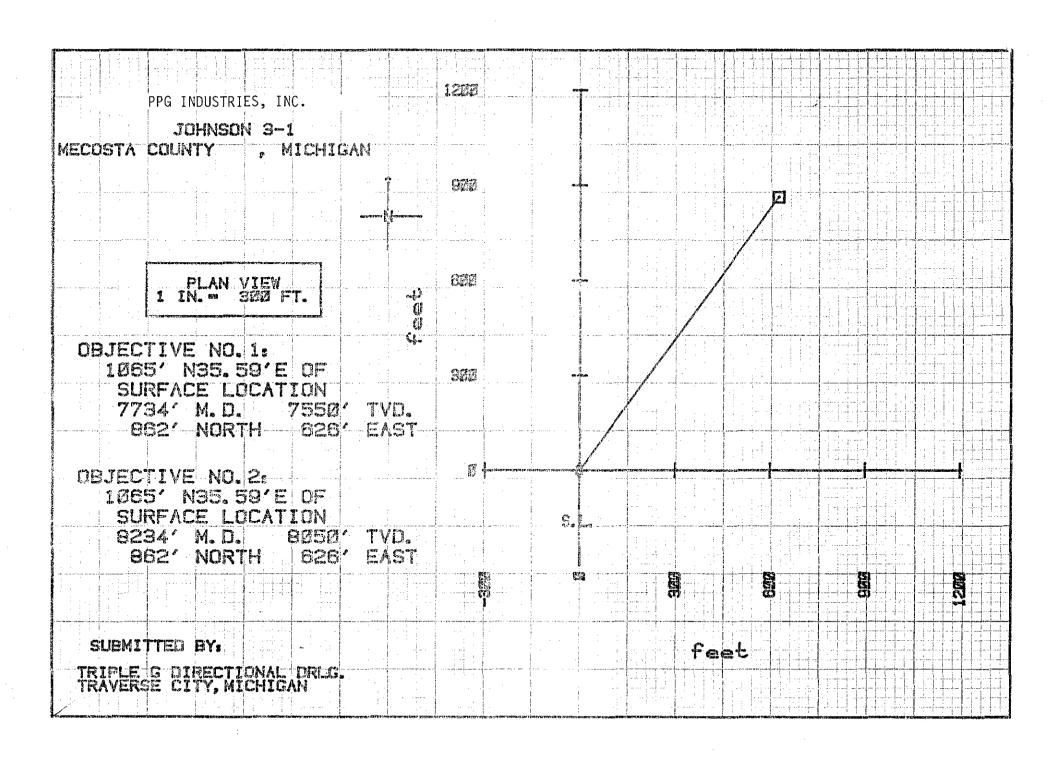
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LESSOR (OWN	ER OF M			,		WELL NO
Don an		oline Joh				(Johnson #3-1) 3-1
LOCATION	NW	¼ of	SE % or	= NE	FRC'L	% SECTION] T. 16 N B. 9 W
TOWNSHIP						COUNTY -
Grant						Mecosta
PLAT BE	LOW R	EPRESENT: (1 Mile Sq	S ONE FULL SEC	TION	N N	 Outline drilling unit and spot well location on plat at left. Where drilling unit crosses section lines, divide the plat into an east half and a west half OR
·	7 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		BOTTOM HOLE	0 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	701611'	a north half and a south half (which ever applies). Outline the unit and locate the well in two directions from NEAREST quarter section and unit lines. 2. Location of well in two directions from NEAREST
бочей чичной бо 92 вы роз	######################################	. .	SURFACE- LOCATION		1237'	quarter section and unit lines is: SURFACE LOCATION
	4 4 5 8 8 4 4 0 0			1077		1077 ft from South (north-south) line of Quarter Section 1237 ft from East line of Quarter Section
				-		ft. from line of unit
		SECTION	7			ft. from line of unit
1824,3444444448		74113488479 0 4884	N 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	n 110 11 11 19 11 11 11	. 411 43 44 6 4 11 11 11 11 11 11 11 11 11 11 11 11 1	3. Describe wellsite marker. Show or describe access route if it is not readily accessible. Wellsite is marked with a painted wood stake. Site can be reached from the North off Balsam Road. See supplemental plat.
	(Scale o	of Plat — 1 ir	nch equals 1320 ft	.)		Ground Elevation = 1156.4 feet, U.S.G.S. datum.
_			AT OR PLOT PI		ta all vaca	Secretary and the secretary an
	structu	res within	300 feet of th	e stal	ke;	Is, power lines, residences, familiarity buildings, and other JERRY JE
	surface	water fe	atures within 1	320 fe	eet of the	stake WILCOX
det pre	ailing paratio	plans for n of an e	hazards prevenvironmental in	ention	and ero	SURVE
NAME OF INDI	VIBUAL /- 1	VYHIG/SURVE	eyed well site Jer	ry L	Wilcox	DATE TITE 11.18. LS#14102 5-4-84 President
ADDRESS J. L			SOCIATES, INC			North U.S131 Manton, Michigan 49663
						CCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF DIFFERENT THAN LESSEE) DATE (MONTH, DAY, YEAR)

Exhibit A

Surface Casing (13-3/8" in 17-1/2" hole @ 900')

- 1. Use insert float and Texas Pattern Shoe and lock to shoe joint with thread lock.
- 2. No centralizers.
- 3. Circulate hole a minimum of one complete circulation.
- 4. Do not reciprocate casing.
- 5. Run bottom (red) wiper plug. Do not use if carrying L.C.M. in cement.
- 6. Pump 70 bbls. fresh water ahead of cement.
- 7. Cement with:
 - 475 sx. 50/50 Pox., 6% total gel, 3% CaCl
 1.54 ft.³/sk., 13.3#/gal., 7.66 gals./sk.
 - b. 200 sx. Class A, 3% CaCl₂ 1.18 ft.³/sk., 15.6#/gal., 7.66 gals./sk.



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				8200		165'		1	8234 <i>'</i>	M. D. TVD.			

SOUR GAS CONTINGENCY PLAN - PART II PPG - JOHNSON #3-1 PAGE 2

NEAREST PUBLIC TELEPHONE

East 0.2 miles on Balsam Road; then North 3/4 of a mile on 120th Avenue; then West 1 1/2 miles on Schofield Road to 135th Avenue; Then North on 135th Avenue two miles; then West 4 1/2 miles on Hersey Road to the general store in the town of Hersey, on 180th Avenue. Phone is located in front of store.

MUD_TREATMENT

A gas buster will be provided.

NOTE: For location of residences, public gathering places and evacuation routes, see vicinity map.

